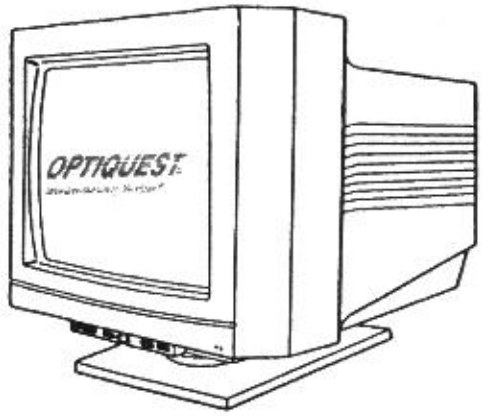
Service Manual

OPTIQUEST 2000DX

Model No. 7056L

15" Digital Controlled Color Monitor



(Rev. 1 - August 1996)

ViewSonic® 20480 E. Business Parkway, Walnut, California 91789 USA - (800) 888-8583

1.2.5 Graphics Mode Resolution

Mode	H. Sync. (KHz)	Resolution
VGA	31.47	640 x 350/640 x 400/640 x 480
SVGA1	35.16	800 x 600
SVGA2	37.879	800 x 600
SVGA3	48.09	800 x 600
8514/A	35.52	1024 x 768
UVGA1	48.37	1024 x 768
UVGA2	56.476	1024 x 768
UVGA3	59.524	1024 x 768
MAC II	35	640 x 480

1.2.6 Misconvergency

Item	Specification
Center/Zone A Corner (Zone B)	0.15/0.40 mm maximum 0.50 mm maximum

1.2.7 Linear Distortion

Item	Specifications
Horizontal Vertical	10% maximum 7% maximum

1.2.8 Size Stability

The size stability is less than 4 mm.

1.2.9 Geometric Distortion

Item	Specification
Horizontal Vertical	to 4 mm maximum to 4 mm maximum

1.2.10 Power Supply

Item	Specification
Input voltage Frequency	90 VAC to 264 VAC 47 Hz to 63 Hz
Consumption	110 watts maximum

1.2.11 External Connector

The monitor has a 15-pin mini D-sub male connector.

1.2.12 Controls

Type	Specification
External	Power
Micro-controls	H-phase, H-width, V-center, V-size, Pincushion, Contrast, Brightness
Internal	H-hold, H-width, H-center, RGB cut-off, RGB driver, HV 25KV adjustment, B+ 25V adjustment, Screen, Focus, V-liner, Keystone adjustment

1.2.13 Character Matrix and Display Color

The maximum character matrix is 9 x 16 and the color graphics is 256.

1.2.14 Ambient Temperature

Item	Specification
Operation Storage	10°C to 40°C -10°C to 60°C

Theory of Operation

This chapter describes how the mainboard, including the switching power supply and deflection circuit, and CRT board in the monitor function as a whole.

2.1 Power Supply Subsystem

The monitor is designed with a universal power supply. The power supply subsystem consists of a EMI network, a rectifier, and a pulse-width-modulation (PWM) controller. The PWM controller includes an oscillator, an error amplifier, a current sense comparator, and a PWM latch. Figure 2-1 shows the power supply block diagram.

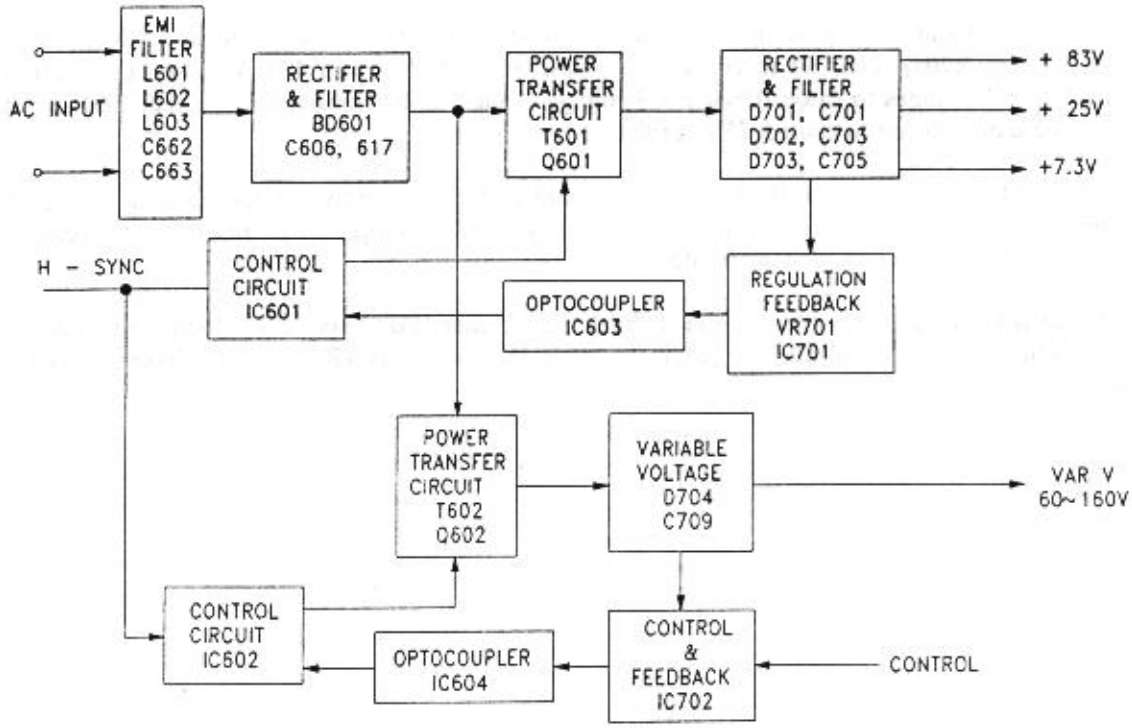


Figure 2-1. Power Supply Block Diagram

2.1.1 EMI Network

The EMI network consists of L601, L602, L603, C663 and C662 to protect the surrounding equipment from interference.

2.1.2 Rectifier and Filter

Diode BD601 acts as a rectifier. The filter consists of C617 and C606. DC voltages (+83V, +25V, VAR and +7.3V) are output to the system via the rectifier and filter. The transistor Q601 controls the status (on or off) of T601. The Q602 controls the status of T602.

2.1.3 PWM Controller

IC601 and IC602 make up the Pulse Width Modulation (PWM) controller. It manages and controls the duty cycles to regulate the secondary output voltage of T601 and T602. The starting circuit (R602, R603 and C609) starts the power supply for the monitor with proper working voltage and current. The auxiliary power comes from T601, D606 and C610, which keep the power supply stable and trigger IC602 on at the same time. IC601 and IC602 generate square waveform pulses and outputs from pin-6 to control Q601 and Q602 for repeated ON-and-OFF operation. T601 and T602 store energy and then continuously transfer it to the secondaries for PWM output.

IC601, IC603 and T601 make up the feedback circuit. SPS outputs 25V via divided voltage circuit (R703, VR701 and R704) to IC701 to control the resistance of IC603 pins 4 & 5. Then the voltage level of IC601 pin 2 changes to cause IC601 pin 3 voltage change, Q601 current change, then T601 stores energy increased or reduced to control 25V feedback.

R614, R612, and C615 as well as R625, R623, and C625 make up the current sensing circuit. The main function of this circuit is to stabilize and protect the power supply from unstable or excessive current. Diode ZD605 is the over-voltage limiter.

The horizontal frequency comes from fly back transformer (FBT) via D608, R610, C614 and C624. It is synchronized with the frequency generated from the oscillators (R608, C613, R609 and R620, C623, R621).

2.2 Deflection Circuit

This section describes the theory of deflection circuit. Figure 2-2 shows a block diagram of the deflecti circuits.

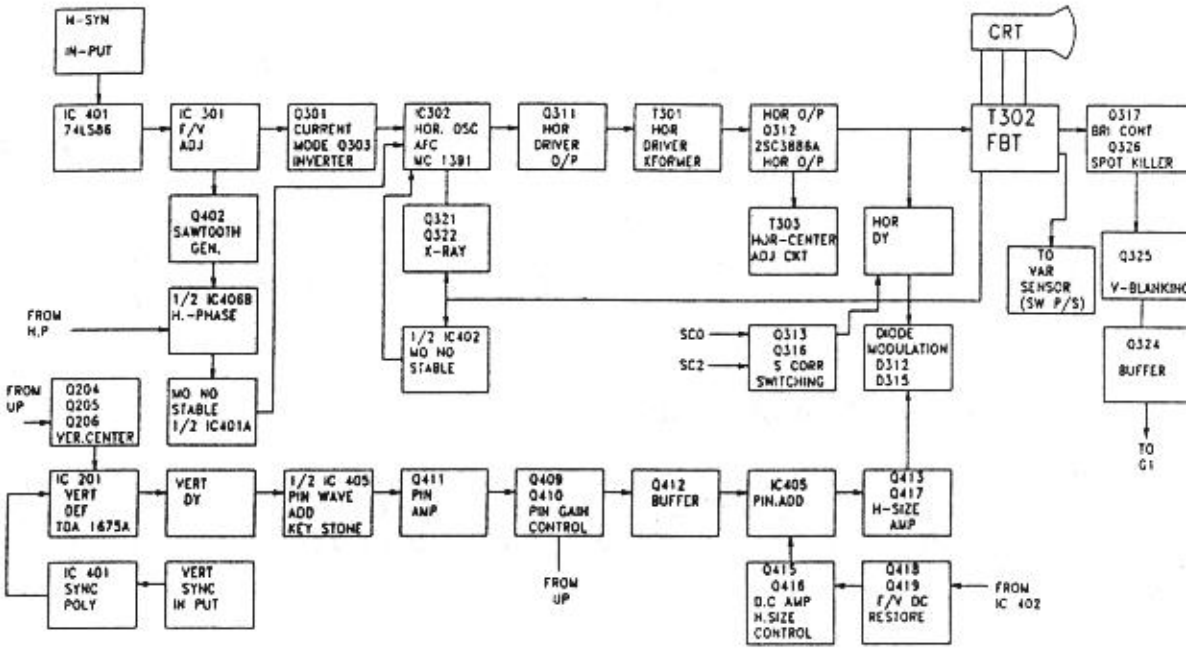


Figure 2-2. Deflection Circuits Diagram

Q327, Q328 and VR303 manage the H-center function. Q326, ZD305, D326, C395 and R396 run as sp killers.

2.2.1 Micro Control Circuits

The micro controller circuits perform the function of mode detection. After IC801 receives input from both horizontal and vertical frequency and polarity, IC801 detects and distinguishes the input mode and produces a PWM (pulse-width-modulation) to control H-phase, H-size, V-center, V-size, side pincushion, brightness and contrast. The PWM duty is changeable with an external tact button switch.

IC801 is a CHMOS single chip which is an 8-bit microcontroller. It has a 4K-byte EPROM program memory and a 128-byte data RAM, 32 programmable I/O lines, and two 16-bit timer/counters. IC802 is an electrically erasable PROM.

The microcontroller can retain 32 different display modes including timing formats and display settings. Its memory is divided into two parts, one for user settings, the other for factory presettings. Each part has a capacity of 16 modes.

The LED indicator goes off after 20 seconds of inactivity. If there are any changes in the settings, the monitor automatically saves the new settings.

IC301 and IC402 are dual, retriggerable, resettable, and monostable multivibrators. They can be triggered from either edge of an input pulse, and produce an accurate output pulse over a wide range of width. The external timing components, Cx and Rx determine the duration and accuracy of the output pulse.

2.2.2 H-phase Control Circuit

A PWM signal output from pin 25 of IC801 controls the H-phase. The PWM is integrated via R824, R825, R826, C814 and C815 and becomes a DC-level. The DC-level is sent to pin 6 of IC406B. An output signal after comparison to the DC-level between pins 5 and 6 of IC406B directly controls the H-phase.

2.2.3 H-size Control Circuit

IC801 pin 26 supplies a PWM signal that is integrated via Q805, Q806, R831, C816, R832 and C817, and becomes a DC-level. The DC-level is sent to Q415, Q416 and IC405B pin 5. A resulting DC-level is sent to the base of Q413 controlling H-size.

2.2.4 V-center Control Circuit

IC801 pin 27 supplies a PWM signal for integration by Q807, R835, C818, R836, C819 and Q808. A DC-level controls the push-pull circuit of Q205 and Q206 results. The on/off duty signal generated from Q205 and Q206 decides the position of V-center.

2.2.5 V-size Control Circuit

A PWM signal is supplied from IC801 pin 28 to Q809, R841, C820, R842 and C821 for integration. It then becomes a DC-level which controls the V-size variety.

2.2.6 Side-pincushion Control Circuit

IC801 pin 22 outputs a PWM signal. The integrated signal becomes a DC-level and then goes to th differential amplifier circuit (Q410 and Q409). The collector of Q412 generates a parabolic waveform t pin 5 of IC405B to compensate the distortion from the side-pincushion.

2.2.7 Horizontal Deflection Circuit

IC301B supplies a synchronous signal to the RC (R301, C301 and C332) constant of IC302 oscillator The reason for changing IC302's oscillating frequency is that it makes the horizontal oscillating frequenc correspond with outside synchronous signals derived from display card.

The horizontal oscillator, IC302, supplies a line sweep signal from pin 1 to switching transistor Q311 Not only does the Q311 serve as a switch resulting horizontal sweep, but it also switches FBT fo generating extra high voltage (EHV) and other DC voltages for some circuits.

The horizontal output circuit FBT pin 3 sends a flyback signal into the AFC circuit via IC402A pin 4 t IC302 pin 4 for AFC operation.

IC801 pin 7 triggers the D330 (signal low if H-frequency > 52 KHz), IC406 pin 1 works with Q313, Q314, C353. IC801 pin 5 works with Q315, Q316, C357 and C362 to modify the S-shape and compensate the horizontal sweep signal for obtaining a better display. The control frequency and capacitor's working status are listed in Table 2-1.

Table 2-1 Horizontal Sweep Signal Settings

Frequency	Q313B	IC801 Pin 7	IC801 Pin 5	Cap. Activities*
Under 34KHz	Low	High	Low	C353 + C357 + C362
34KHz - 45KHz	Low	High	High	C353 + C362
45KHz - 52KHz	High	High	Low	C357 + C362
52KHz - 60KHz	High	Low	High	C362

FBT pin 3 outputs a horizontal blanking pulse to Q324 to add a high pulse to G1 for blanking the electronic beam at the horizontal flyback time.

*: The "+" means the capacitors work in parallel.

2.2.8 Vertical Deflection Circuit

The vertical synchronous signal from IC401C pin 8 goes to IC202 pin 5 to synchronize the vertical frequency. R204 and C203 and ZD201 are part of the vertical oscillation circuit for oscillating operation. A vertical blanking signal from pin 1 is transmitted to Q325 to add a high pulse to G1 for blanking the electronic beam at the vertical flyback time. Pin 1 outputs vertical sweep signal to the V-Yoke.

2.2.9 Hold-down Circuit

Pin 3 of FBT delivers a feedback voltage to D318, C372, ZD306, D319 and Q321 to avoid system damage from excessive current. If the voltage of FBT pin 3 increases to a certain level, it triggers Q321 and Q322 on and causes pin 6 of IC306 to be grounded shutting down the monitor system.

2.3 Video Board

The video board consists of the video processing circuit and video amplifying circuit. Figure 2-3 shov the video circuit block diagram.

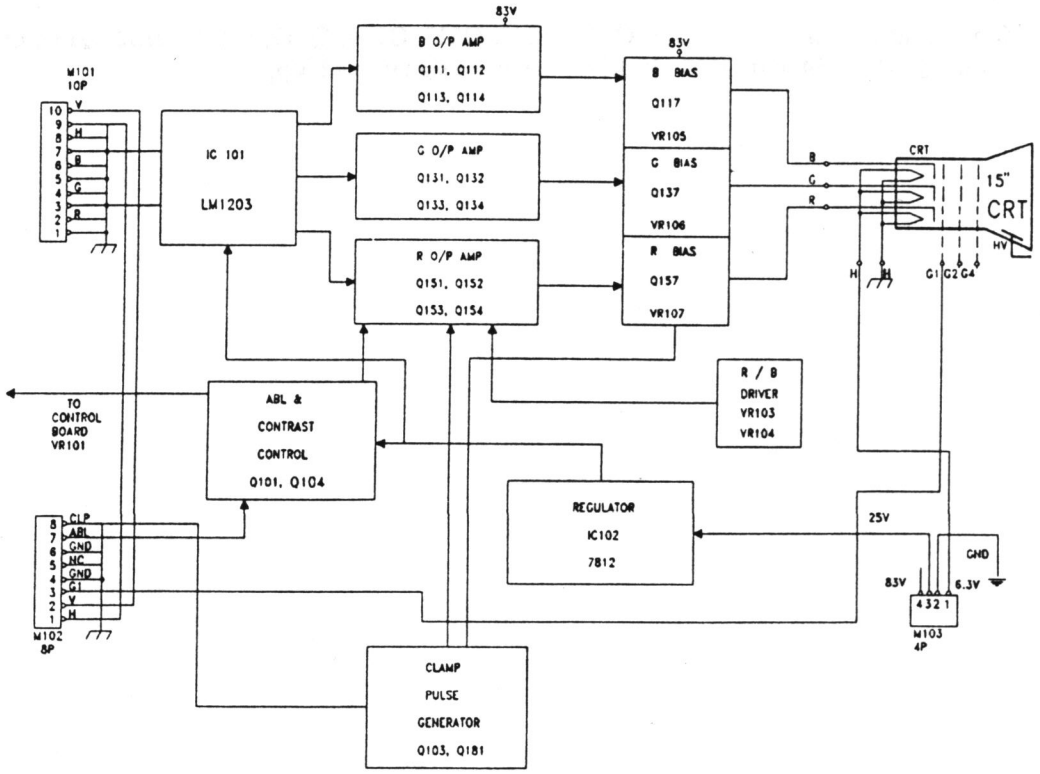


Figure 2-3. Video Circuit Block Diagram

2.3.1 Video Processor

The video processor, IC101, offers gain control, contrast control, and black level clamping. The pulse comes from FBT pin 3 via R416, C463 and D404 integration to Q103 as video clamping and Q181 as DC clamping. Q101 and Q104 work as the ABL (Auto Brightness Limitation) circuit. The current on FBT pin 7 compared with the current via R394 came from SPS to get a voltage to be sent to Q101 base and then compared with the voltage output from R171 and D102 to maintain and control brightness output. VR103 and VR104 adjust foreground white balance of text and graphic color. VR105, VR106 and VR107 adjust background white balance of raster color.

2.3.2 Video Amplifier

The video output amplifier consists of Q111, Q112, Q113, Q114, Q117, Q131, Q132, Q133, Q134, Q137, Q151, Q152, Q153, Q154 and Q157. It drives the video signal to 42 Vpp.

Adjustment Instructions

This chapter describes how to adjust the screen display.

3.1 Adjustment Tools

Have the following items handy when you make adjustments to this monitor:

- Multimeter
- Color analyzer
- Test or demonstration program
- VTVM with a high-voltage probe
- Screwdrivers

3.2 Preliminary Adjustment

1. Pre-set all variable resistors (VR) to the center position except the red-green-blue (RGB) bias variable resistors, VR105, VR106 and VR107.
2. Set the RGB VRs counterclockwise to the maximum position.
3. Turn the monitor on and warm it up for at least 30 minutes.

3.2.1 B+ (25 V) Adjustment

1. Set the brightness and contrast to maximum.
2. Input a crosshatch pattern from the test program.
3. Adjust VR701 to B+ = 25Vdc +/- 0.2Vdc.

3.2.2 H-Hold Adjustment

1. Input a crosshatch pattern (800 x 600 III) from the test program.
2. Short circuit TP3 to the nearest ground.
3. Adjust H-hold control VR301 to make a picture running only in the horizontal direction, then remove the shorted wire (TP3) and check the picture stability.

3.2.3 High Voltage Adjustment

1. Input a crosshatch pattern (800 x 600 III) from the test program.
2. Press **Contrast** ⊖ and **Brightness** ⊖ to minimum and adjust the G2 VR (screen) of the FBT to the cut-off position.
3. Adjust VR304 until the anode voltage is 25.0 KV $\pm$ 0.2 KV.

3.2.4 Clearing EEPROM Data

1. Turn the monitor off.
2. Press and hold the **Select** ⊜ and **Reset** buttons simultaneously. Turn the monitor on. All LEDs are lit. **Now the monitor is in the factory presetting area.**
3. Press the Select ⊜ and Adjust ⊕ buttons simultaneously to clear all data in the EEPROM.

3.2.10 Purity Adjustment

1. Select video mode (640 x 400 VGA1) from the color pattern.
2. Adjust the purity magnet by turning the two overlapping pawls in opposite directions. Figure 3- shows the magnet location.

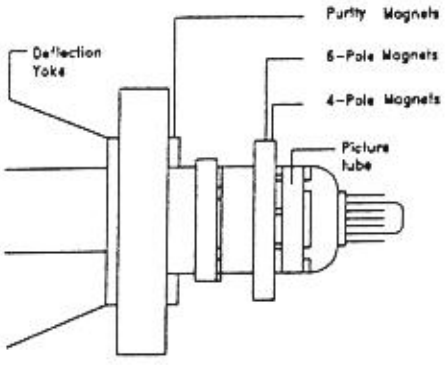


Figure 3-1 Magnet Location

3.2.11 Static Convergence Adjustment

1. Display crosshatch pattern using video mode 640 x 400 VGA1.
2. Check the static convergence that whether it meets the specifications in section 1.2.6.
3. If the static convergence is incorrect, open the two pawls of the 4-pole magnet (see Figure 3-1) t overlap the vertical red and blue lines as shown in Figure 3-2.
4. Rotate the 4-pole magnet to overlap the horizontal red and blue lines.
5. Display yellow crosshatch pattern from the test program.
6. Make the vertical red and blue lines overlap with the green lines by rotating the two pawls of the pole magnet as shown in Figures 3-2.
7. Rotate the two pawls of 6-pole to overlap the horizontal red and blue lines with the green lines.

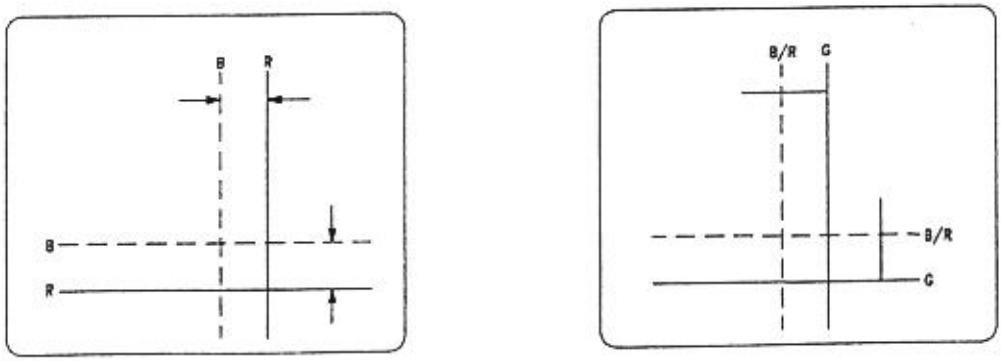
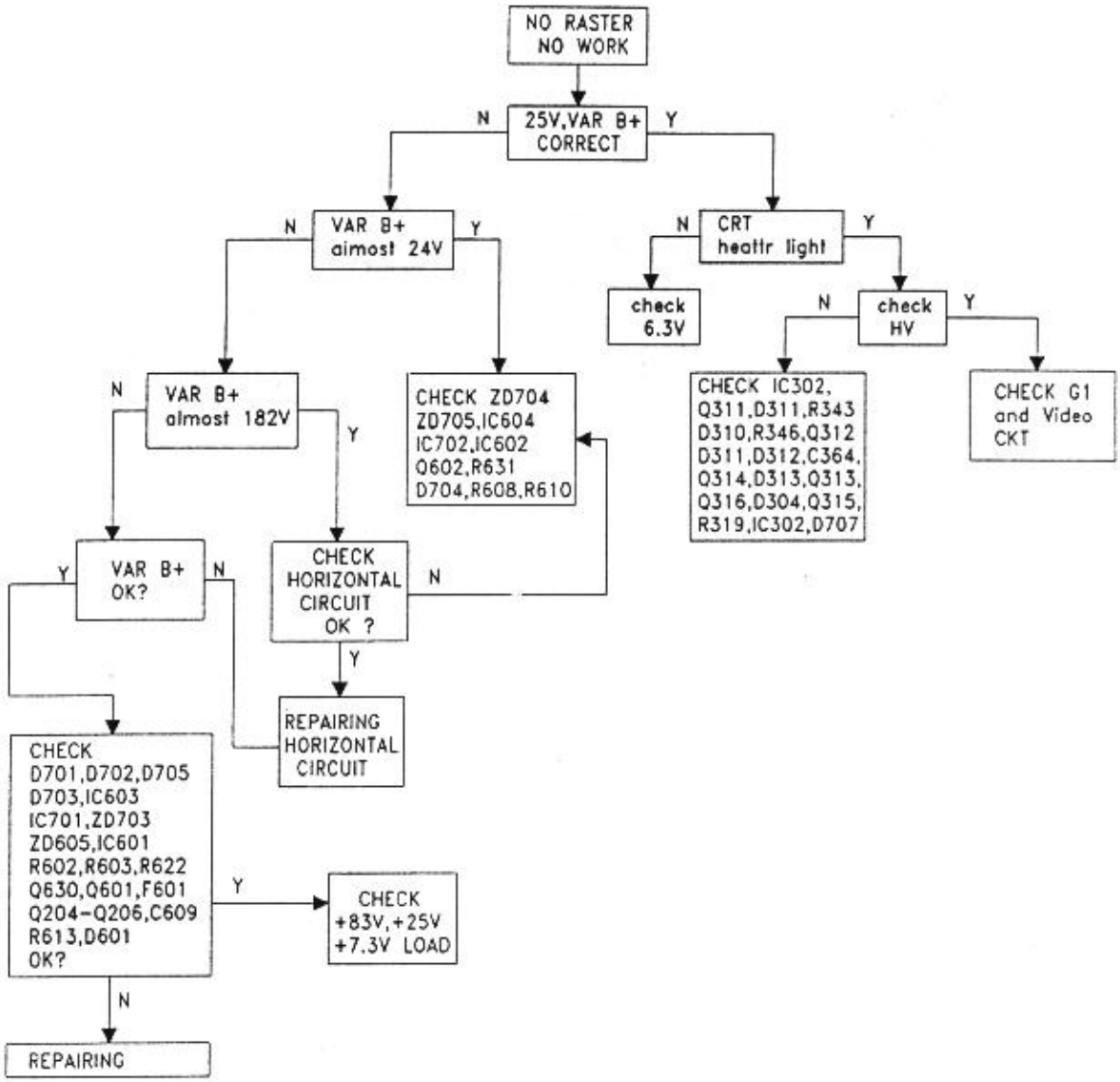


Figure 3-2 Static Convergence Adjustment

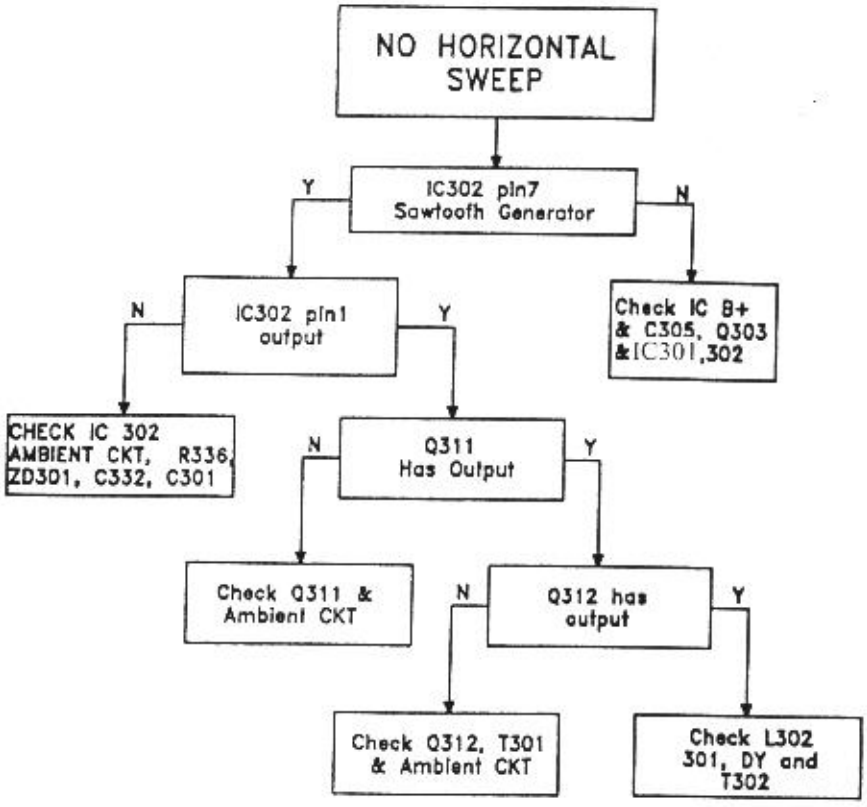
Troubleshooting and Safety Instructions

This chapter contains flowcharts for troubleshooting possible monitor problems, and guidelines for saf operation and service of the 2000DX monitor.

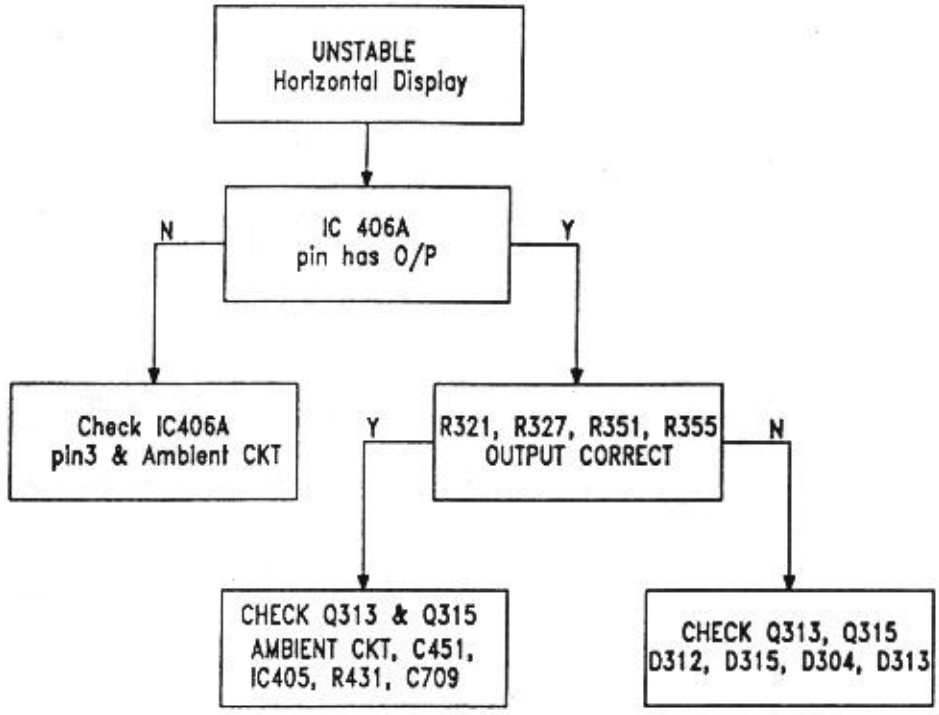
4.1 No Raster/No Work



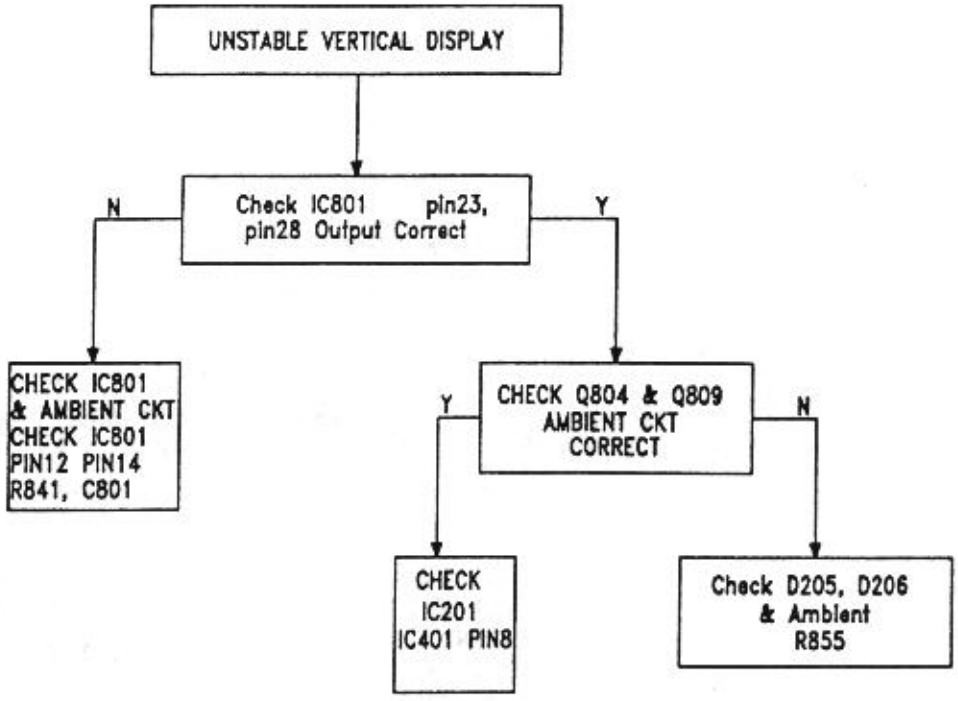
4.2 No Horizontal Sweep



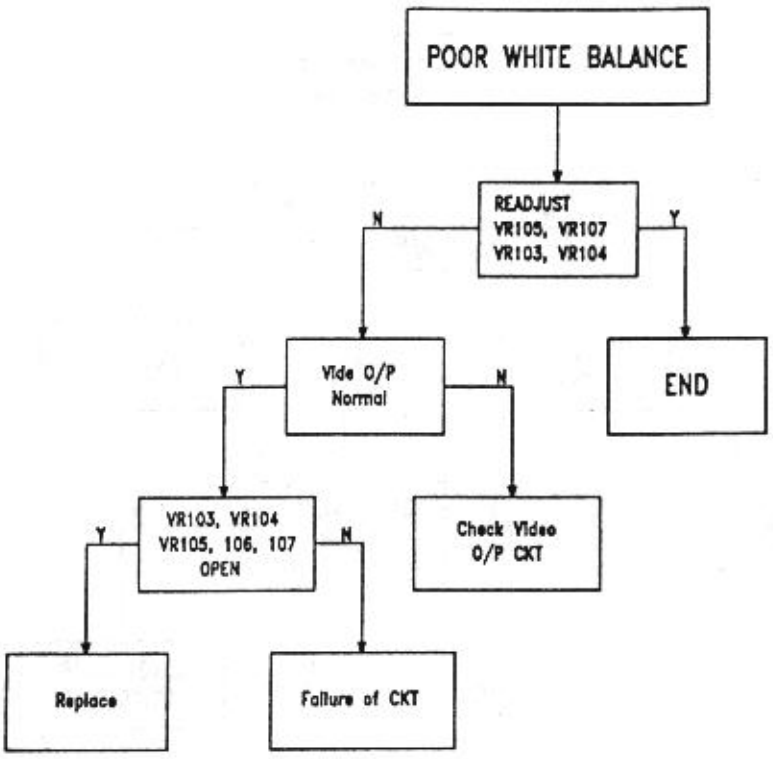
4.3 Unstable Horizontal Display



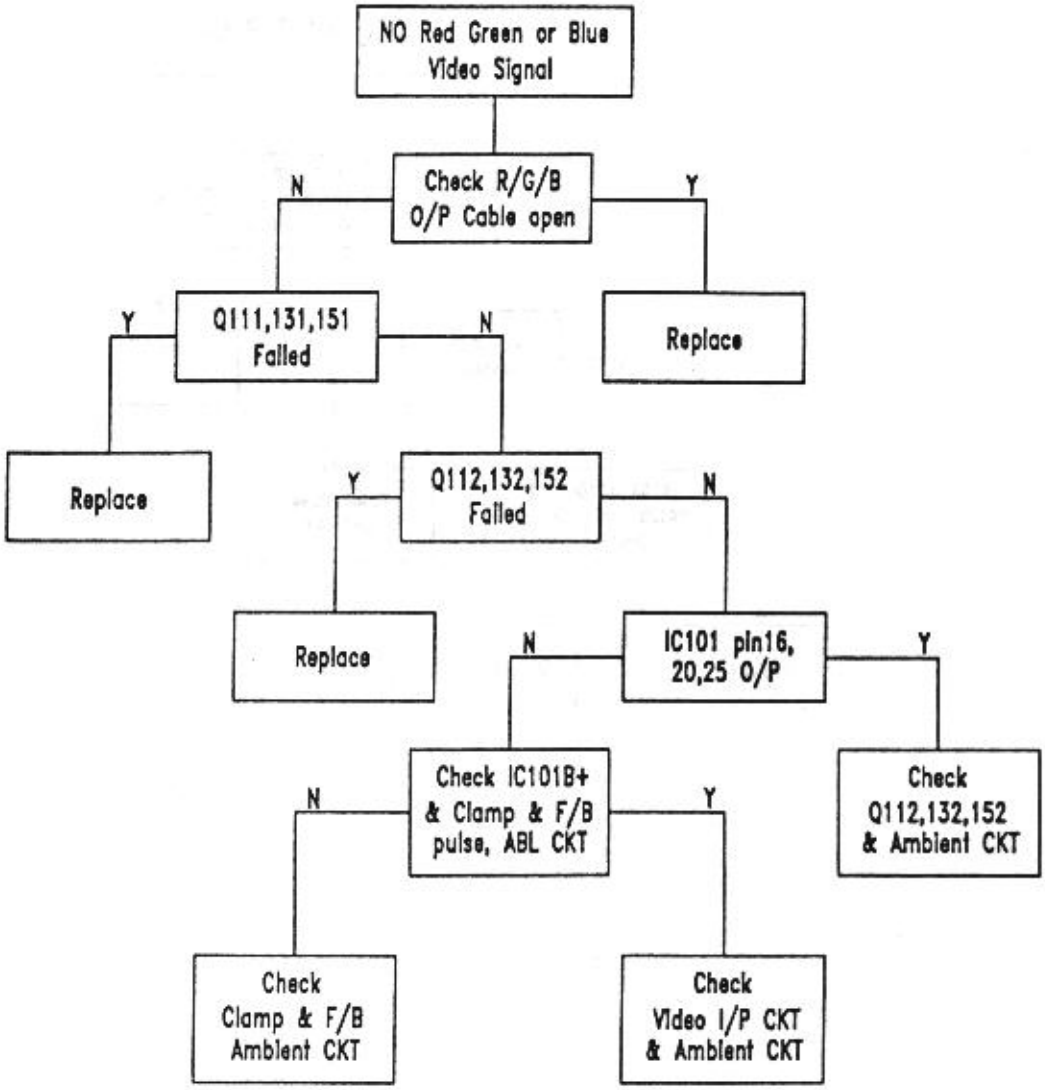
4.4 Unstable Vertical Display


UNSTABLE VERTICAL DISPLAY
Check IC801 pin23, pin28 Output Correct
N
Y
CHECK IC801 & AMBIENT CKT CHECK IC801 PIN12 PIN14 R841, C801
CHECK Q804 & Q809 AMBIENT CKT CORRECT
Y
N
CHECK IC201 IC401 PIN8
Check D205, D206 & Ambient R855

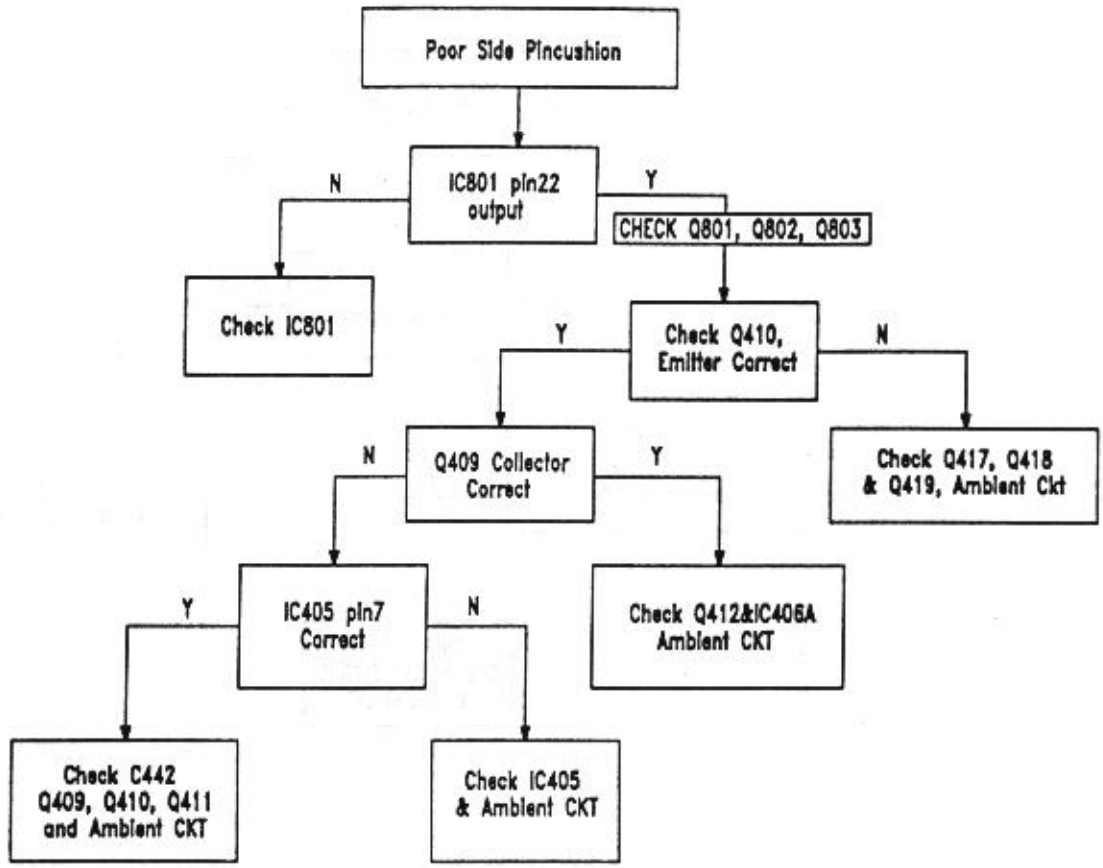
4.5 Poor White Balance



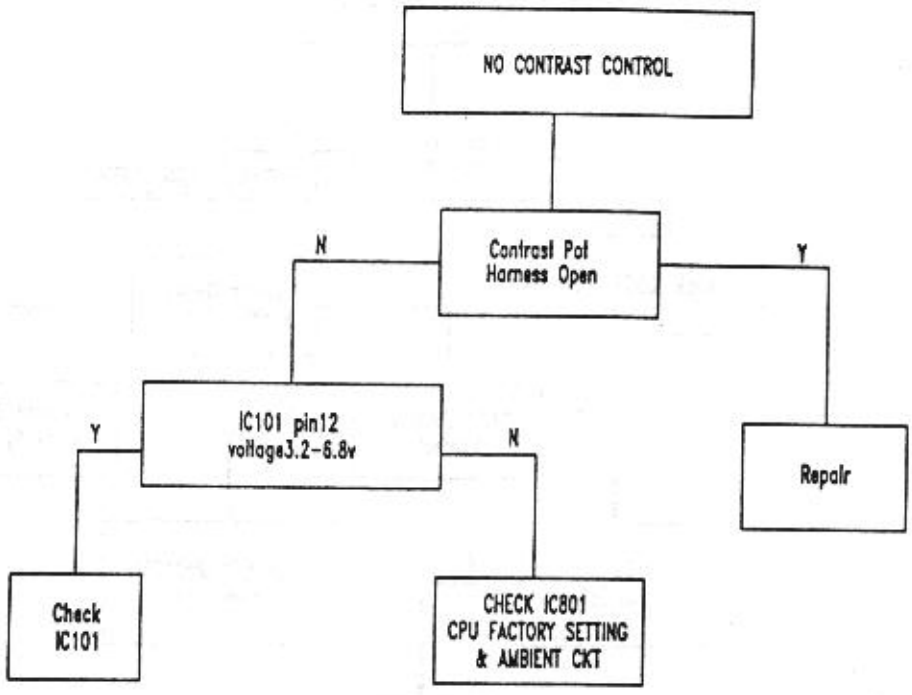
4.6 No RGB Video Signals



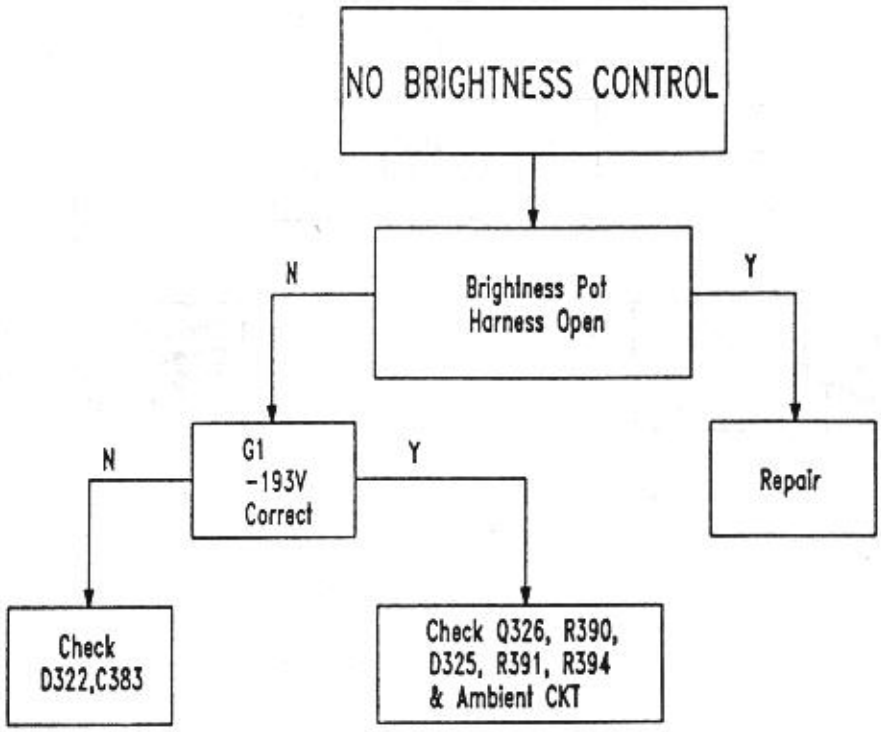
4.7 Poor Side Pincushion



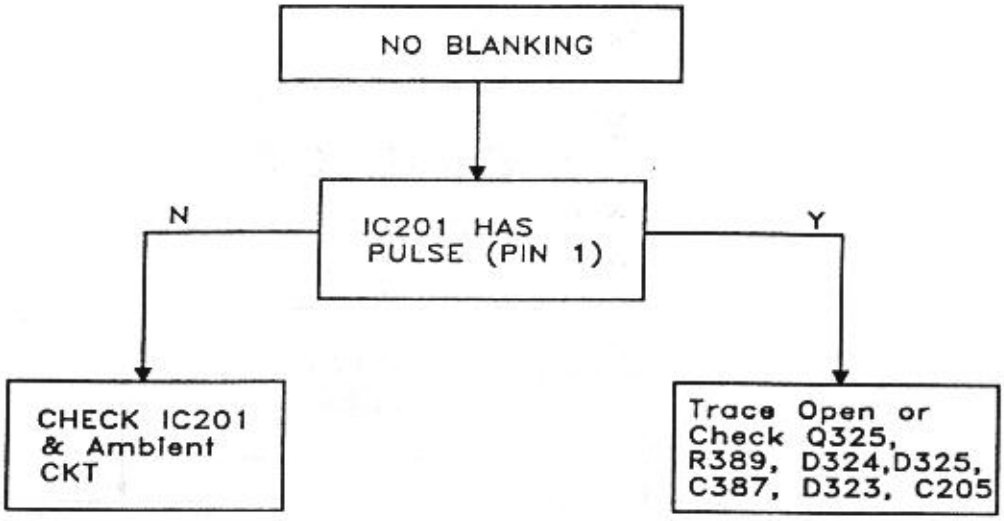
4.8 No Contrast Control



4.9 No Brightness Control



4.10 No Blanking



4.11 Safety Instructions

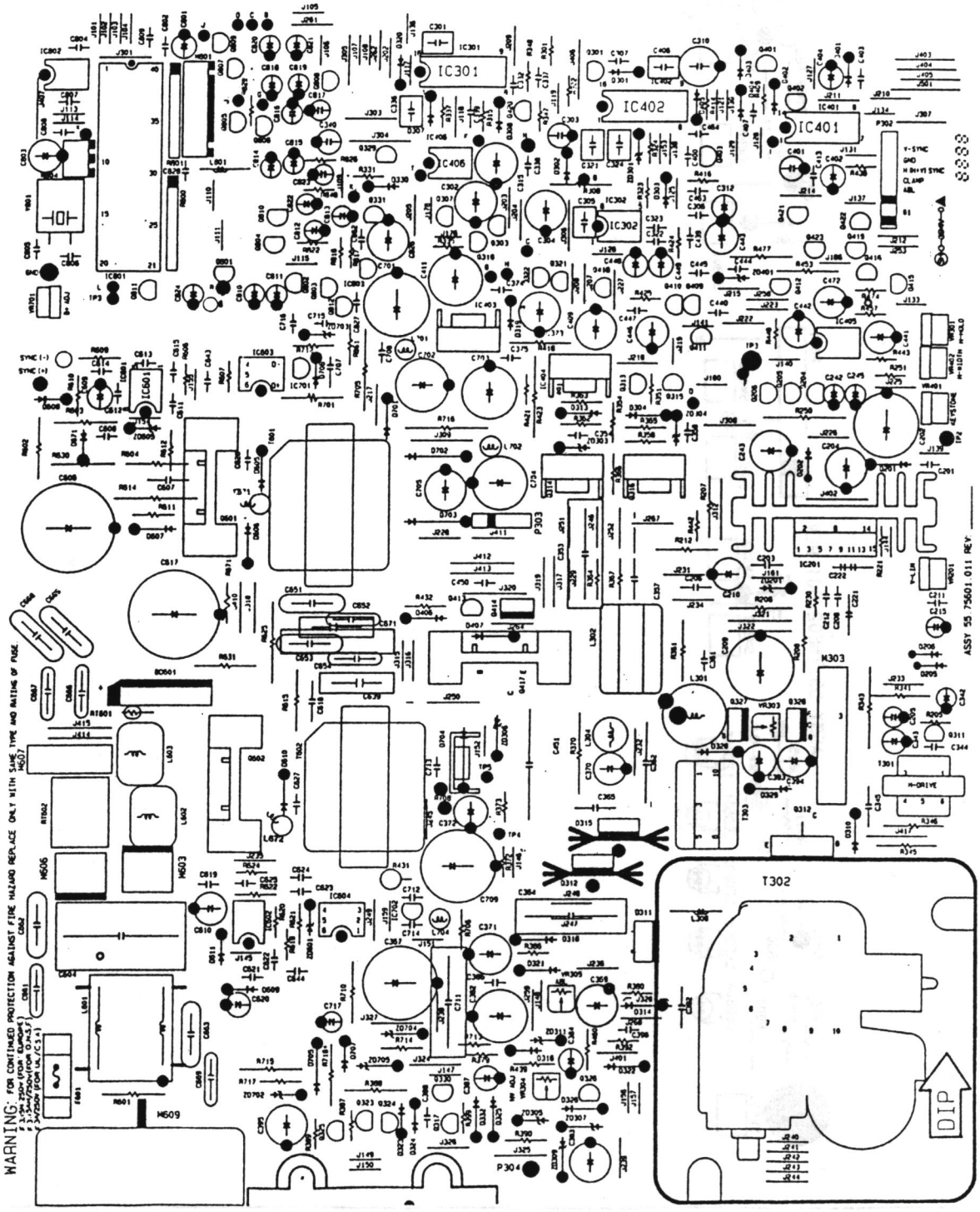
1. Do not attempt to modify any circuits.
2. Before servicing, disconnect the ac plug from the power outlet.
3. Do not tamper with the protective grounding conductor or protective earth terminal.

4.12 Servicing the High Voltage System

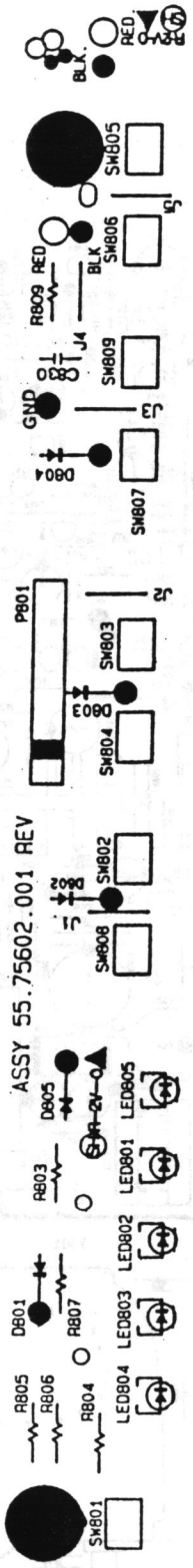
1. When servicing the high voltage system, discharge the system with a 10K ohm resistor in series with an isolated wire between the chassis and the anode lead.
2. If replacement is necessary, always use the same type of CRT.
3. Do not hold the CRT by the neck, as it is very fragile.

Layout Diagrams

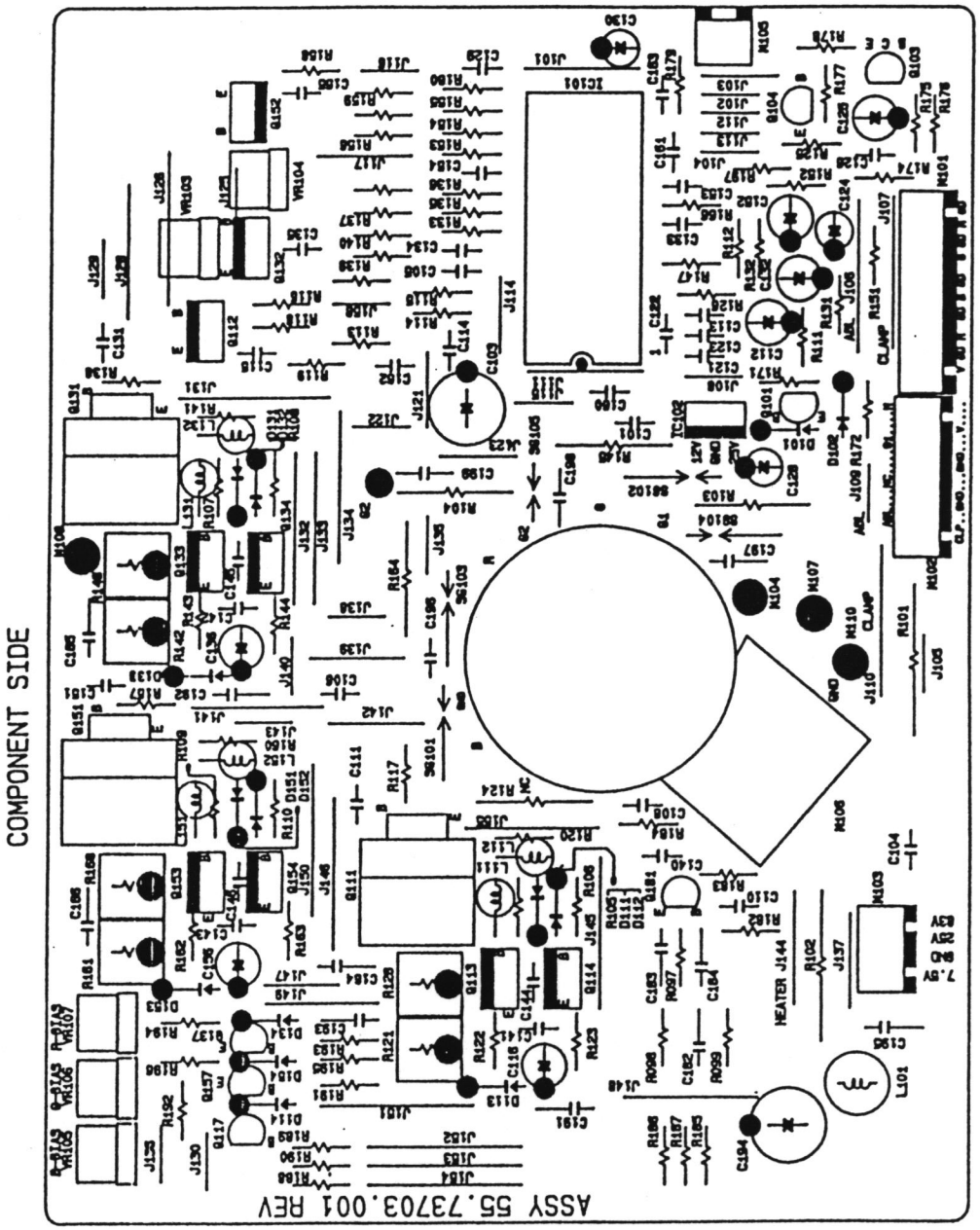
A.1 Mainboard



A.2 Control Panel Board



A.3 CRT Board



Circuit Diagrams

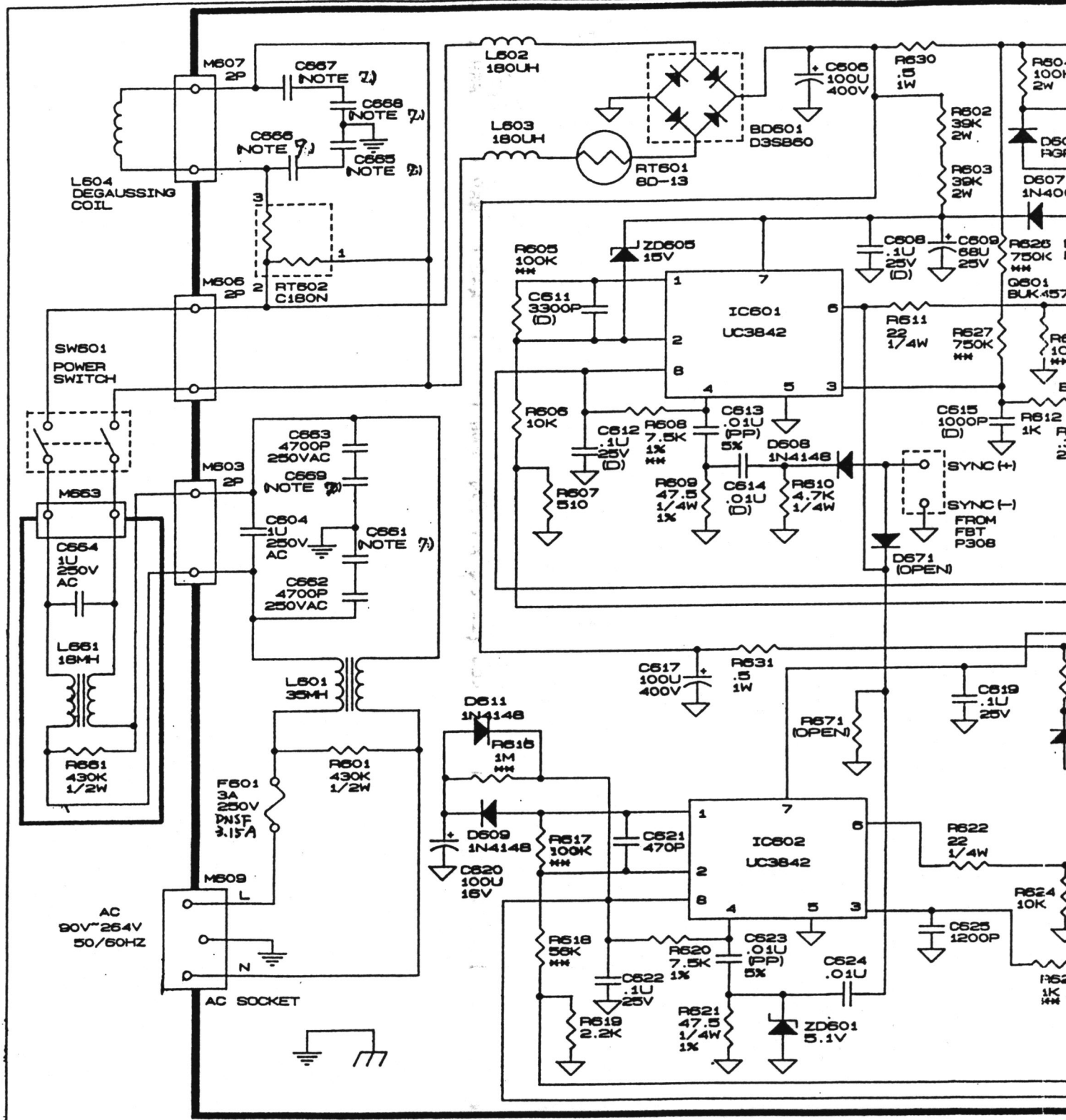
B.1 Power Supply Circuit Diagram

B.2 Video Circuit Diagram

B.3 Deflection Circuit Diagram

B.4 Control Circuit Diagram

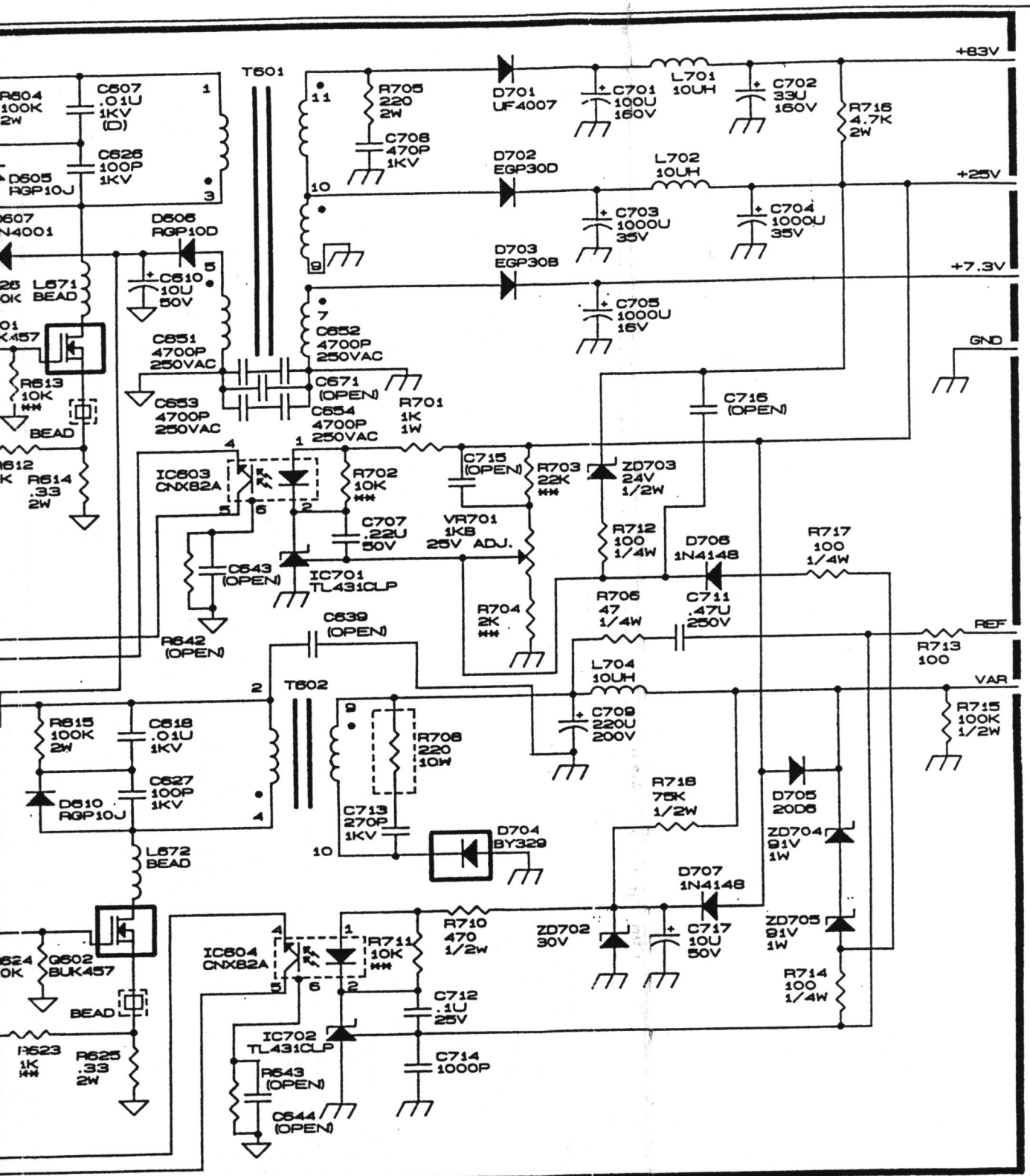
B.1 Power Supply Circuit Diagram



NOTES

1. RESISTOR VALUES ARE IN OHM, K=1,000 OHM M=1,000,000 OHM
2. ALL RESISTORS ARE 1/8 WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN uF UNLESS OTHERWISE INDICATED. P=PF
4. ALL CAPACITORS ARE 50V EXCEPT WHERE OTHERWISE INDICATED.
5. /// REPRESENTS PCB COMMON GROUND. ⏚ EARTH (METALLIC FRAME) GROUND AND ▽ PRIMINARY CIRCUIT GROUND.
6. COMPONENTS MARKED WITH *** ARE CHIP TYPE RESISTORS.
7.

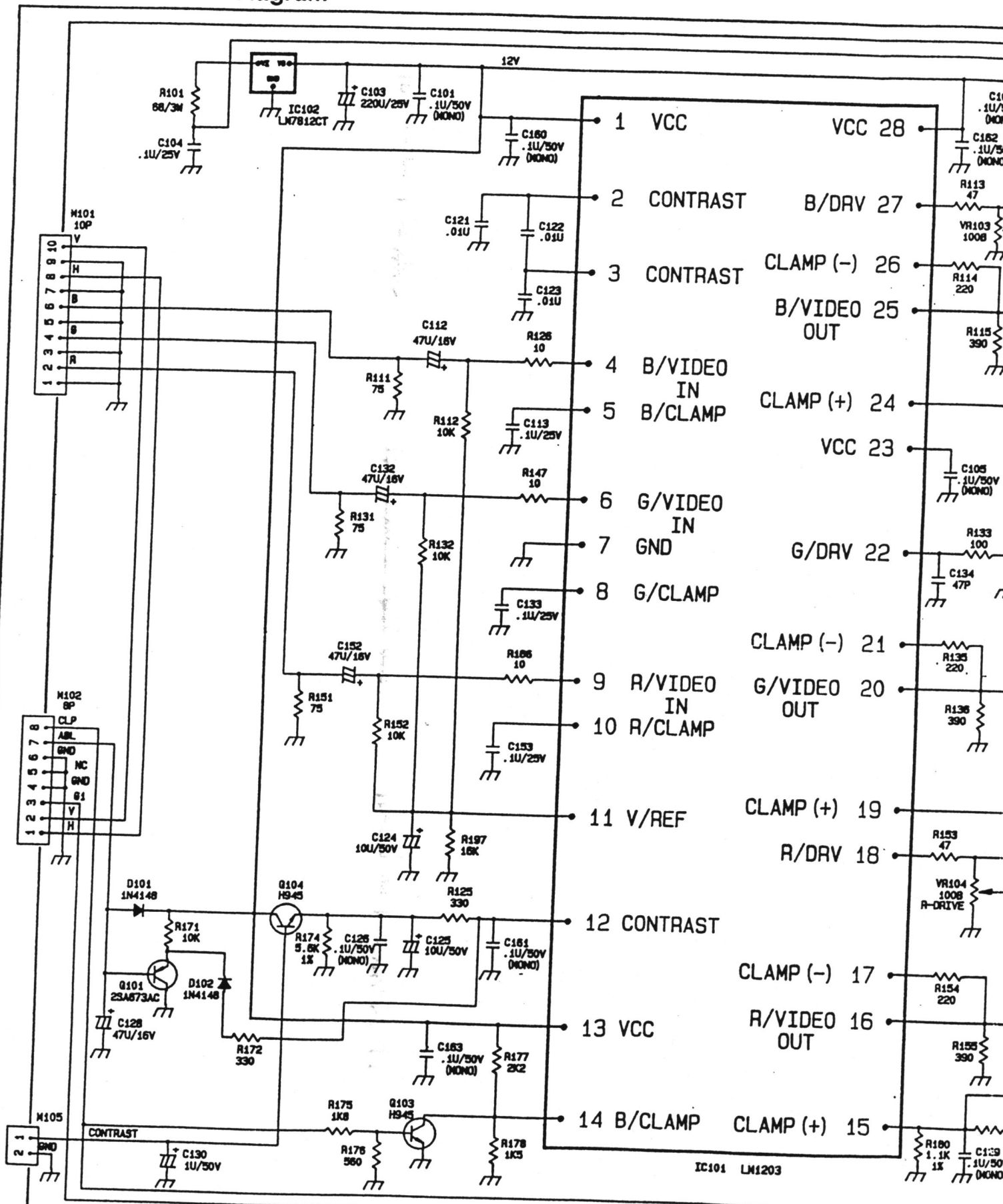
	WI
C661	
C665	
C666	
C667	
C668	
C669	

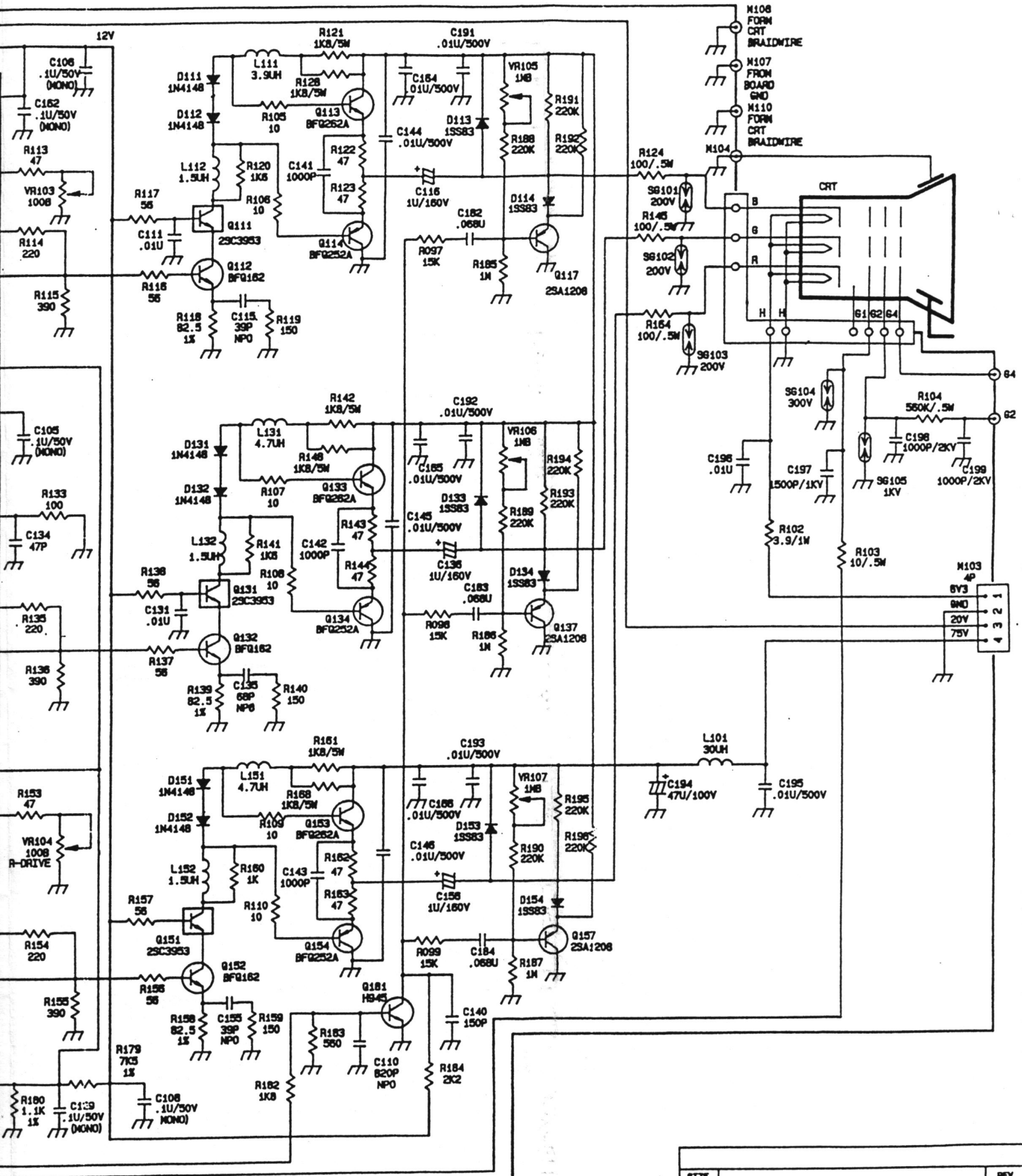


WITHOUT DNSF	WITH DNSF
SHORT	4700P/250VAC
OPEN	4700P/250VAC
OPEN	4700P/250VAC
OPEN	4700P/250VAC
OPEN	4700P/250VAC
SHORT	4700P/250VAC

Size	Document Number	REV
B		C
Date: May 5, 1992	Sheet 3 of 4	

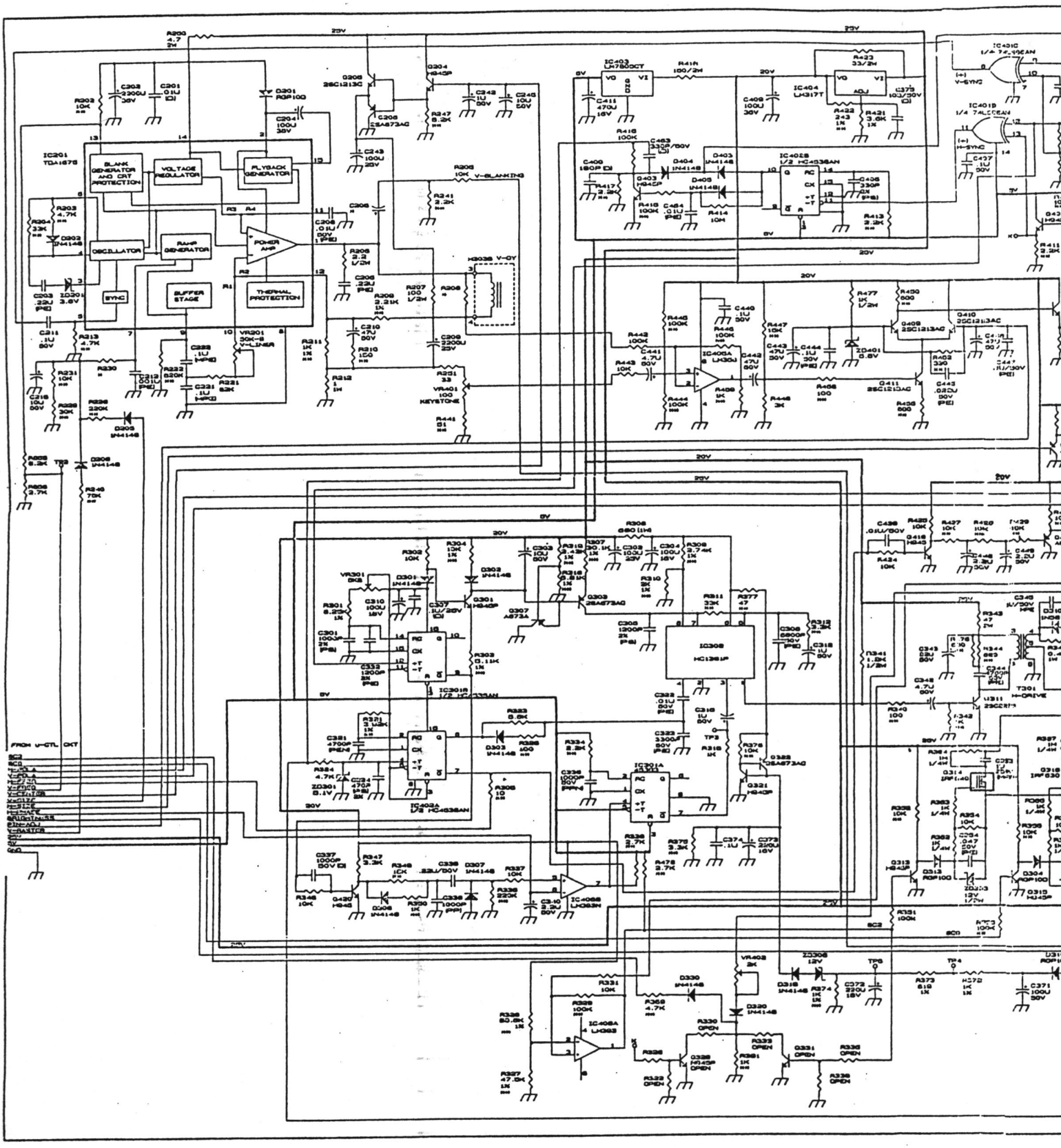
B.2 Video Circuit Diagram

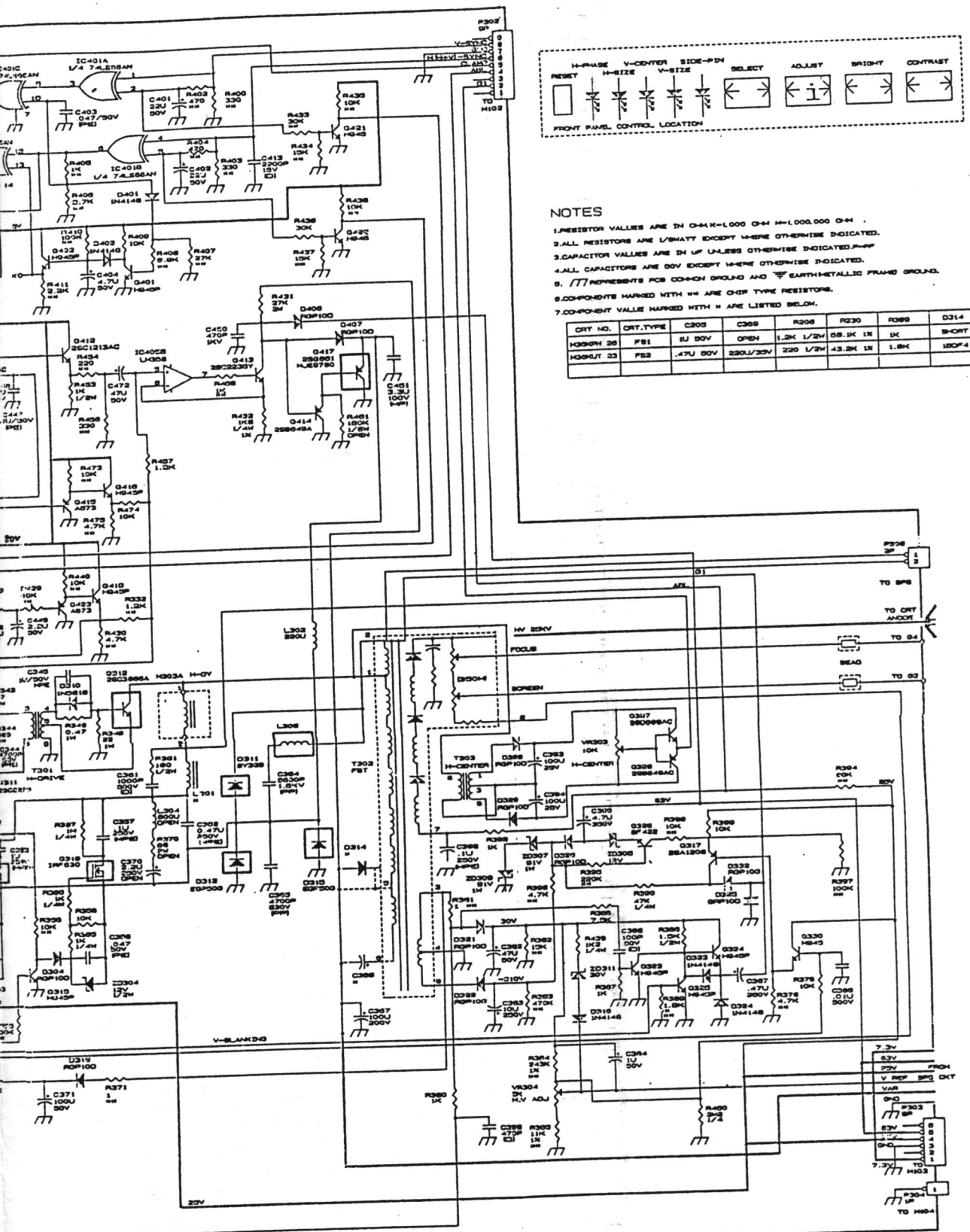




SIZE	56-VDO	REV C
DATE : 1992-5-6	Sheet 4 of 4	

B.3 Deflection Circuit Diagram

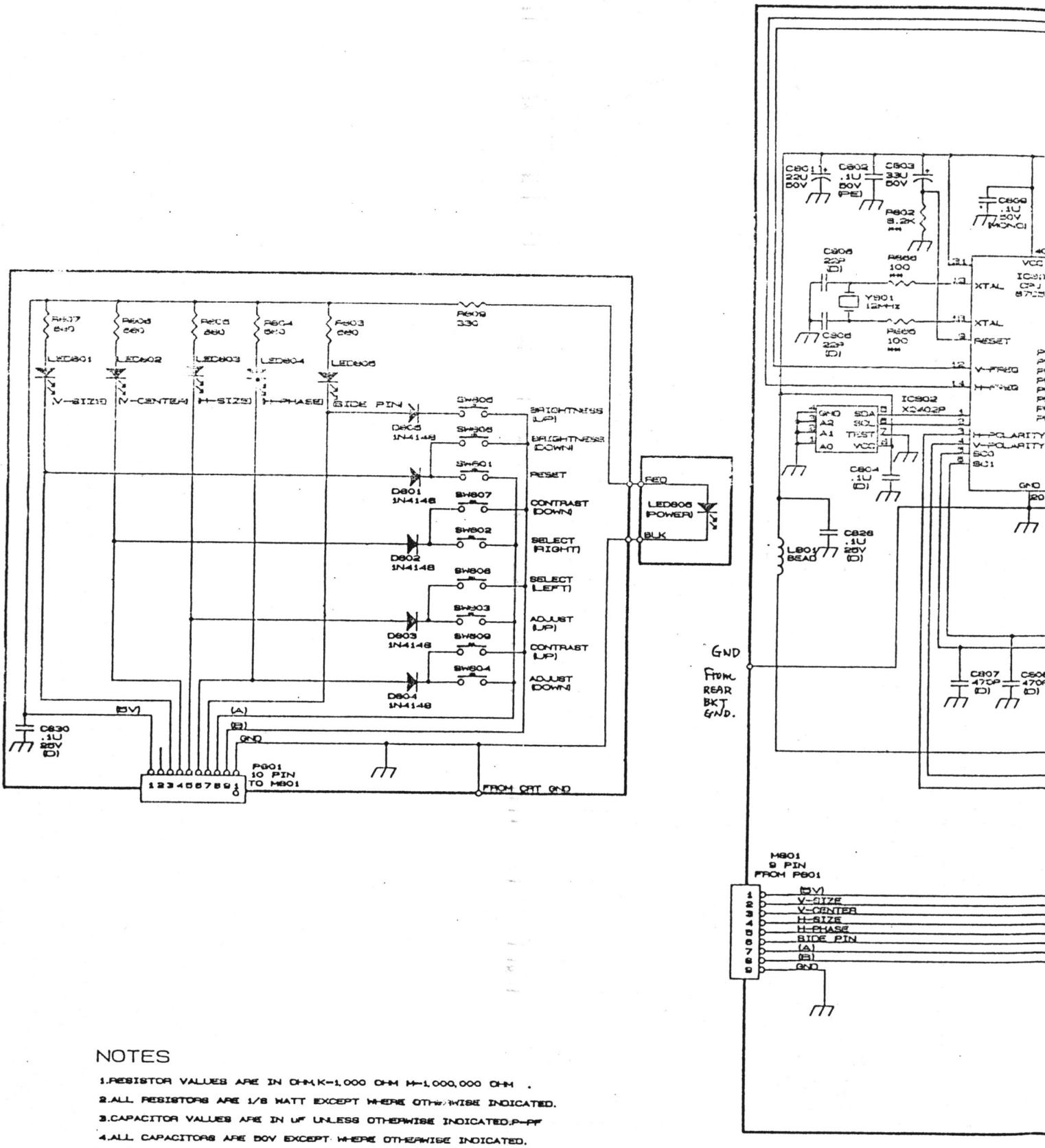




NOTES

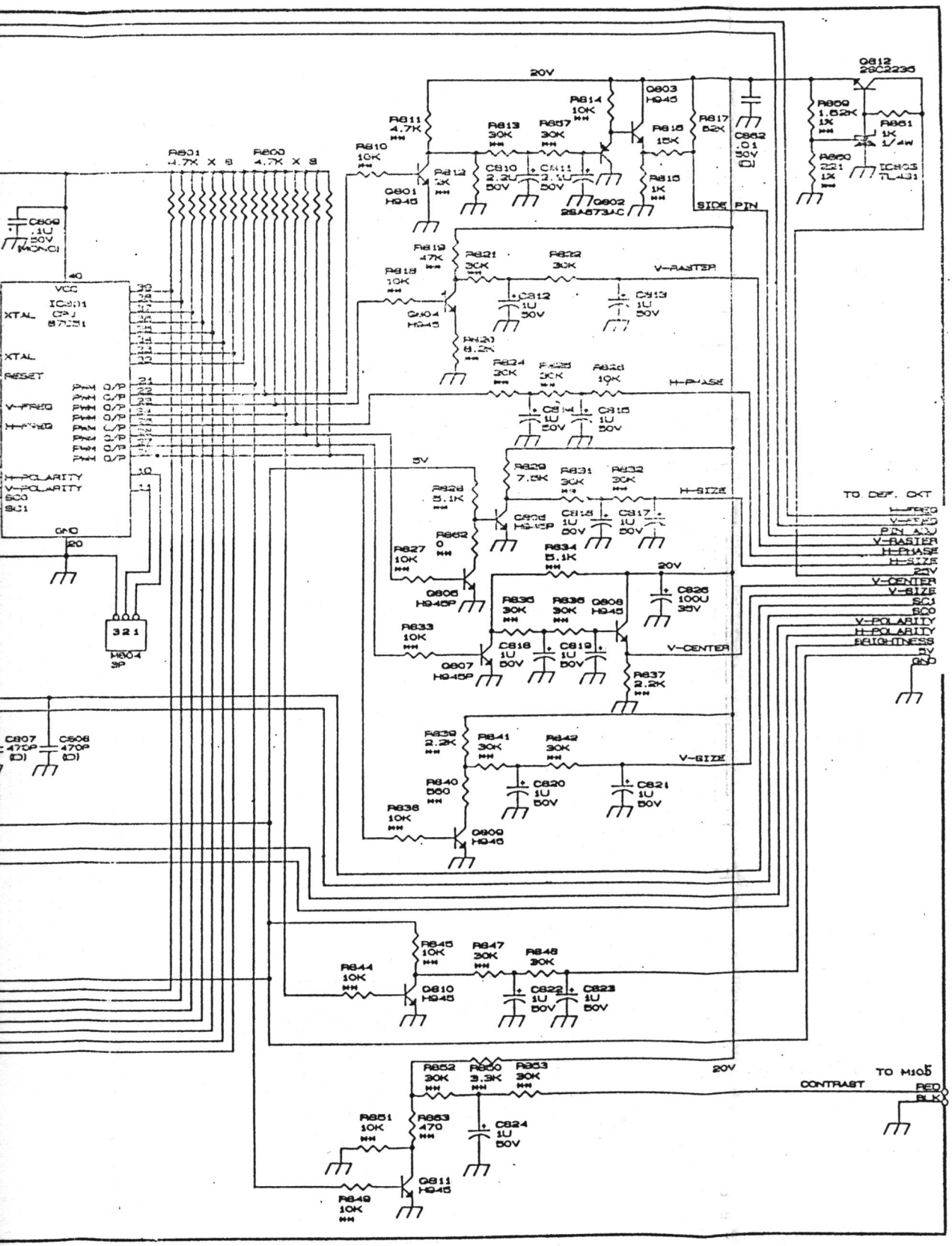
1. RESISTOR VALUES ARE IN Ω=1, K=1,000 Ω=1K, M=1,000,000 Ω=1M .
2. ALL RESISTORS ARE 1/8WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN uF UNLESS OTHERWISE INDICATED.P=PF
4. ALL CAPACITORS ARE 50V EXCEPT WHERE OTHERWISE INDICATED.
5. ⏚ REPRESENTS PCB COMMON GROUND AND ⏚ EARTH/METALLIC FRAME GROUND.
6. COMPONENTS MARKED WITH ** ARE CHIP TYPE RESISTORS.
7. COMPONENT VALUE MARKED WITH * ARE LISTED BELOW.

CRT NO.	CRT.TYPE	C209	C369	R208	R230	R369	D314	L301
M36KPH 26	FB1	1U 50V	OPEN	1.2K 1/2W	68.1K 1%	1K	SHORT	19.50024.C 7UH
M36KUT 23	FB2	.47U 50V	220U/35V	220 1/2W	43.2K 1%	1.8K	150P4	19.50024.C 8.7UH



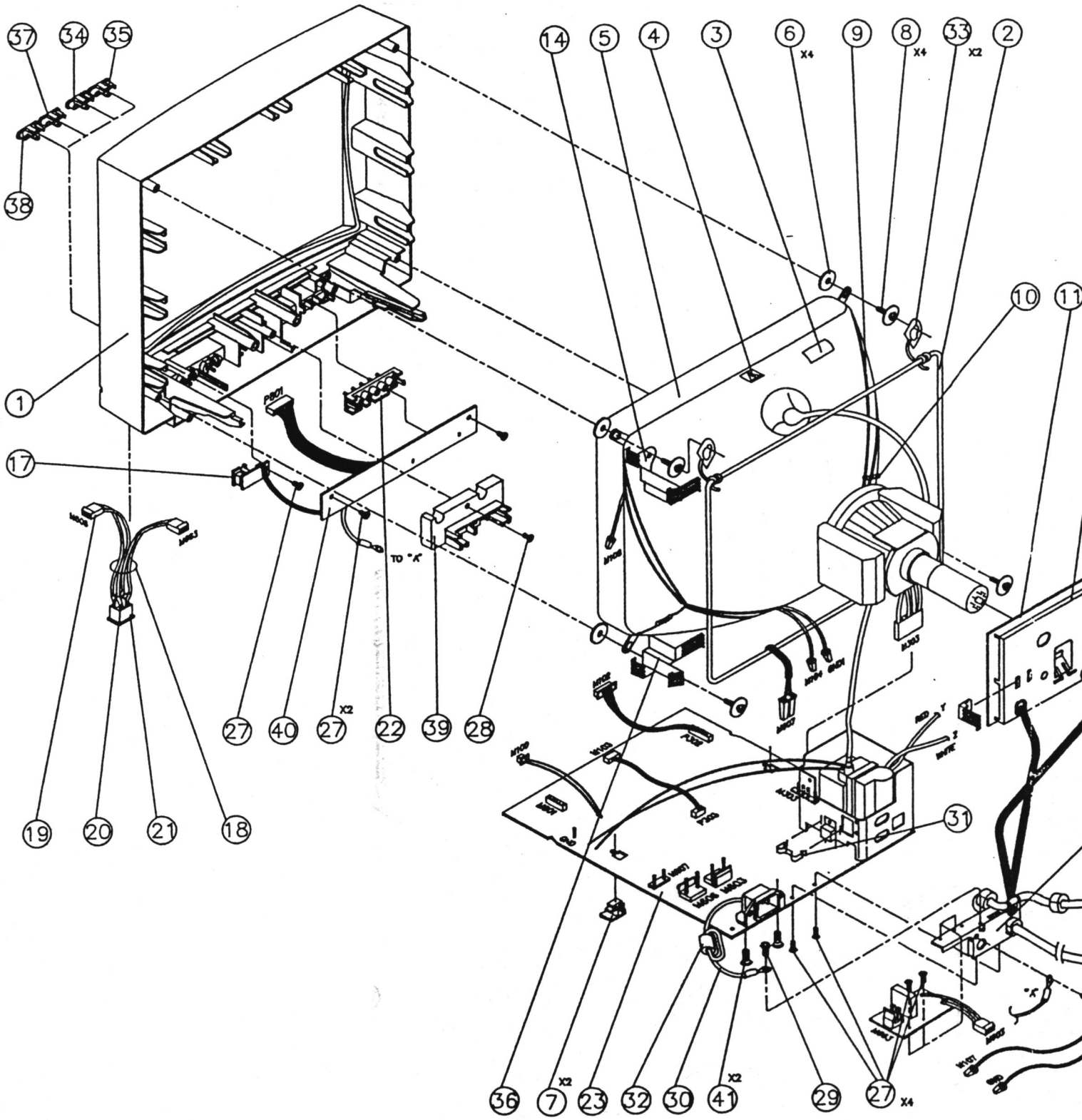
NOTES

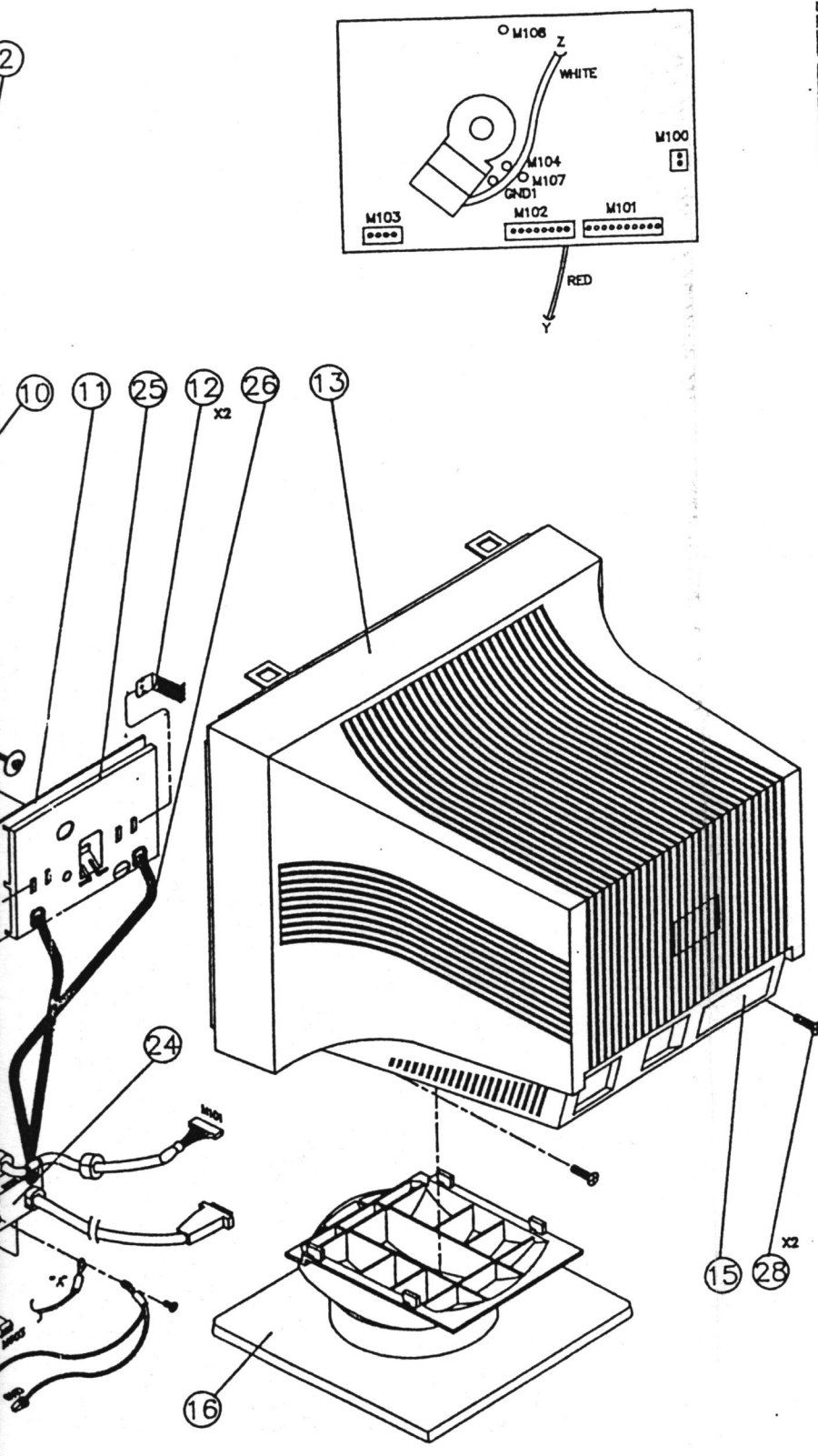
1. RESISTOR VALUES ARE IN OHM, K=1,000 OHM M=1,000,000 OHM .
2. ALL RESISTORS ARE 1/8 WATT EXCEPT WHERE OTHERWISE INDICATED.
3. CAPACITOR VALUES ARE IN uF UNLESS OTHERWISE INDICATED, P=PF
4. ALL CAPACITORS ARE 50V EXCEPT WHERE OTHERWISE INDICATED.
5. /// REPRESENTS PCB COMMON GROUND AND ⏚ EARTH (METALLIC FRAME) GROUND.
6. COMPONENTS MARKED WITH ** ARE CHIP TYPE RESISTORS.



ACERVIEW 56 SCHEMATICS (μ-CTL CKT)		
Size C	Document Number	REV C
Date: May 5, 1992	Sheet 2 of 4	

Spare Parts Diagram





ITEM	PART NO	DESCRIPTION	QTY
1	60.75604.0XX	BEZEL NORYL 7056	1
2	19.90012.001	COIL DEGAUSSING 7056	1
3	45.61003.00X	110V LBL HV WARN	1
4	45.71502.001	LBL WARR HV ART	1
5	56.05756.011	CRT 15" M36KUT23XX01	1
6	47.73101.001	SPACER CRT RUB	4
7	42.75301.001	SPACER PCB NYLON66	2
8	86.00008.281	SCRW TAP WASHER M5*25L C-Zn	4
9	50.75601.001	W.A.1P(CRT GND)BRAID 580MM 7056	1
10	34.71510.002	SPG GND TEN SUS	2
11	55.75603.001	VIDEO BD 7056	1
12	31.71503.002	GND PLATE A	2
13	60.75605.0XX	CAS U NORYL 7056	1
14	34.75607.001	PLATE-GND UPPER	1
15	40.75601.0XX	LBL,FCC/UL/CSA/TUV/FTZ ALL	1
16	60.75602.XXX	ASSY BASE 7056	1
17	42.75607.001	LENS LED PC 7056	1
18	38.05001.001	TIE CABLE	6
19	60.73102.001	W.A. 2P/3P WITH PWR SW	1
20	27.00300.6R0	TUBE SHRINK 6D BLK UL/CSA	10cm
21	22.40003.051	SW,ROCK,DPST,6A 250V ST	1
22	42.73703.001	LENS LED PC	1
23	55.75601.XXX	MAIN BD 7056	1
24	60.75601.001	ASSY REAR BRKT 7056	1
25	31.73501.001	PLT SHD CRT SPTE	1
26	50.60311.011	W.A.1P(GND)BRAID 115MM	2
27	86.YA224.8R0	SCRW TAP TRS M3*8L Zn	7
28	86.PA526.160	SCRW TAP PAN M4*16L NI	3
29	86.00010.161	SCRW TAPTILE TRS W/EXT M4*9L	1
30	50.61007.003	W.A. 1P(GND)1015 #18 280MM	1
31	34.75603.001	CLIP	1
32	25.70044.001	CORE D17.5*9.5*28.5	1
33	34.75605.001	CLIP CABLE	2
34	42.75601.XXX	BTN ADJ ABS 7056	1
35	42.75602.XXX	BTN SLCT ABS 7056	1
36	34.75606.001	PLATE-GND LOWER	1
37	42.75604.XXX	BTN CTRS ABS 7056	1
38	42.75605.XXX	BTN BRI ABS 7056	1
39	42.75606.001	FRAM ABS 7056	1
40	55.75602.001	CTRL BD 7056	1
41	86.RA528.8R0	SCRW TAP TRS M4*8L NI	2

F/N: C:\MOR\7056\7056-CA.DWG

Spare Parts Lists

When you place a spare parts order, be sure to indicate the following data on the order:

- Part number
- part name
- Location
- Quantity

D.1 Spare Parts

PART NAME	PART NO	LOCATION	Q'TY/SET
MAIN BD 7056	55.75601.011 (L.)		1
CTRL BD 7056	55.75602.001		1
VIDEO BD 7056	55.75603.001		1
			1
CTN AB 507*457*434 7056L	44.75601.061		1
ASSY BASE 002 7056	60.75602.001		1
			1
BEZEL NORYL 002 7056L	41.75601.021		1
SW ROCK DPST 6A 250V ST SW601	22.40003.051		1
CAS U NORYL 002 7056	39.75601.031		1
COIL DEGAUSSING 7056	19.90012.001		1
S.A. 10/15P (D-CONN) 1750mm	50.70108.021		1
SWIVEL ABS 002 7056	42.75608.001		1

D.2 Spare Parts for Mainboard

PART NAME	PART NO	LOCATION	Q'TY/SET
IC CMOS 74HC4538 DIP 16P	03.04538.100	IC301,402	2
IC V.R. TL431C TO-92 3P	04.00431.030	IC701,702,803	3
IC V.C. LM393 DIP 8P	04.00393.020	IC406	1
IC VERT.DEFLECT. TDA1675 ZIP	04.01675.070	IC201	1
IC V.R. UC3842 DIP 8P	04.03842.040	IC601,602	2
IC OP LM358 DIP 8P	04.00358.010	IC405	1
IC C.C MC1391P DIP 8P	04.01391.070	IC302	1
IC µCTRL MASK 87C51 12M DIP40	01.80C51.120	IC801	1
IC EEPROM X2402 256*8 DIP 8P	02.02402.000	IC802	1
IC V.R. 7805C P TO-220 3P	04.07805.030	IC403	1
IC OPTO CNX82A DIP 6P	05.0082A.010	IC603,604	2
FET MOS BUK457 NC TO-220AB	06.00040.020	Q601.602	2
XTOR BF422 TO-92 NPN P RT	06.00422.010	Q326	1
FET MOS IRF630 NC TO-220	06.00630.020	Q316	1
FET MOS IRF640 NC TO-220	06.00640.020	Q314	1
XTOR 2SB861 C TO-220 PNP	06.00861.010	Q417	1
XTOR 2SB649A C TO-126 PNP P	06.00649.01A	Q328, Q414	2
XTOR 2SD669A C TO-126 NPN P	06.00669.01A	Q327	1
XTOR 2SA673A C TO-92 PNP P RT	06.00673.01A	Q206,303,802, Q307,322,415,423	7
XTOR 2SA1208 S TO-92 NPN P RT	06.01208.011	Q317	1

Spare Parts for Mainboard (continued)

PART NAME	PART NO	LOCATION	Q'TY/SET
XTOR 2SC1213A C TO-92 NPN P RT	06.01213.01A	409-412	4
XTOR 2SC2235 Y TO-92 NPN P RT	06.02235.010	Q311,Q205,Q812,Q413	4
XTOR 2SC3886 TO-3P NPN P PWR	06.03886.010	Q312	1
DIODE FAST RGP 10J 600V 1A	06.1R060.120	D605,D610	2
DIODE ZEN 24V 1/2W DO-35 5%	06.24R03.071	ZD703	1
DIODE ZEN 3.6V 1/2W DO-35 5%	06.3R603.070	ZD201	1
DIODE ZEN 36V 1/2W DO-35 5%	06.36R03.070	ZD307	1
DIODE ZEN 5.6V 1/2W DO-35 5% T	06.5R603.070	ZD401	1
DIODE ZEN 91V 1W DO-41 5%	06.91R03.070	ZD704,705,309	3
DIODE FAST UF4007 1KV 1A	06.1R0A0.122	D701	1
DIODE S.B. 1N5818 30V 1A DO-41	06.1R003.110	D310	1
DIODE REC 1N4001 50V 1A DO-41	06.1R005.030	D607	1
DIODE FAST RGP10G 400V 1A	06.1R040.120	D322,332	2
DIODE SW 1N4148 100V 0.15A	06.04148.040	D707,D706	2
DIODE REC 20D6 600V 2A DO-41	06.2R060.030	D705	1
DIODE REC UF5408 1KV 3A	06.3R0A0.121	D704	1
DIODE BRI D3SBA60 600V 4A	06.4R060.151	BD601	1
DIODE FAST EGP30B 100V 3A	06.3R010.122	D703	1
DIODE FAST EGP30D 200V 3A	06.3R020.121	D702	1
DIODE FAST FES8JT 600V 8A	06.8R060.120	D315,312	2
DIODE FAST 15DF4 400V 1.5A	06.1R540.121	D314 (56L)	1

Spare Parts for Mainboard (continued)

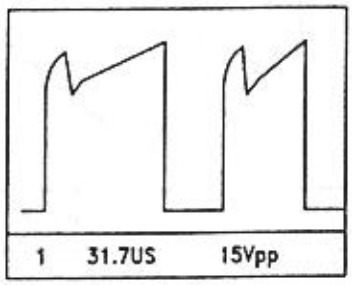
PART NAME	PART NO	LOCATION	Q'TY/SET
XFORM FBT 7056	19.70018.001	T302	1
XFORM H-DRV EI-19	19.60017.001	T301	1
XFORM POWER EI-40 1/OP	19.20052.001	T602	1
XFORM POWER EI-40 3/OP 7056	19.20055.001	T601	1
XFORM H-CENTER EI-22 SB5S	19.60018.001	T303	1
SVR 1K B 6D 5*2.5 V	17.30026.102	VR701	1
SVR 10K B 6D 5*2.5 H BOTH	17.40008.103	VR303	1
SVR 5K B 6D 5*2.5 H BOTH	17.40008.203	VR304	1
SVR 100 B 6D 5*2.5 V	17.40009.101	VR401	1
SVR 2K B 6D 5*2.5 V	17.40009.202	VR402	1
SVR 5K B 6D 5*2.5 V	17.40009.502	VR301/VR304	2
THERM 100/18 PTC 18*13*18	17.60018.00A	RT602	1
THERM 8 NTC 13D	17.60006.8R0	RT601	1
CHOKE 220UH EI-25 7056	19.40060.001	L302	1
CHOKE LINEAR 8.7UH 7056L	19.50024.001	L301	1
FUSE 3A 250V ST20 F UL/CSA	26.13001.109	F601	1
CAPPS 1000P 50VG	11.10244.04C	C301	1
CAP MPP 0.47Uf250V JRF22.5	11.47436.06K	C362	1
RES M0F 0.5 J1W	13.R5034.03E	R630, R631	2

D.3 Spare Parts for Video Board

PART NAME	PART NO	LOCATION	Q'TY/SET
IC RGB VIDEO AMP LM1203 DIP	04.01203.010	IC101	1
IC V.R. 7812 TO-220 3P	04.07812.030	IC102	1
XTOR 2SA673A C TO-92 PNP P RT	06.00673.01A	Q101	1
XTOR H945 P TO-92 NPN P RT	06.00945.010	Q103,181,104	3
XTOR 2SC3953 E TO-126 NPN P	06.03953.010	Q111,131,151	3
XTOR BFQ162 TO-126 NPN P	06.00162.010	Q112,132,152	3
XTOR BFQ252A TO-126 PNP P	06.00252.01A	Q114,134,154	3
XTOR BFQ262A TO-126 NPN P	06.00262.01A	Q113,133,153	3
XTOR 2SA1208 S TO-92 PNP P RT	06.01208.011	Q117,137,157	3
DIODE SW 1SS83 300V 0.2A DO-35	06.1SS83.040	D113,114,134, D133,153,154	6
SVR 100 B 6D 5*2.5 V	17.40009.101	VR103,104	2
SVR 1M B 6D 5*2.5 V	17.40009.105	VR105,106,107	3
CHOKE 30UH 0.4D 7004	19.46020.001	L101	1
PEAK COIL 1.5UH J 0810 RT5 D	18.1R53W.10D	L112,132,152	3
PEAK COIL 3.9UH J 0810 RT5 D	18.3R93W.10D	L111	1
PEAK COIL 4.7UH J 0810 RT5 D	18.4R73W.10D	L131,151	2
LED D3*3.5 GRN Diffus Flange	06.00036.142	LED801 ~ 805	5

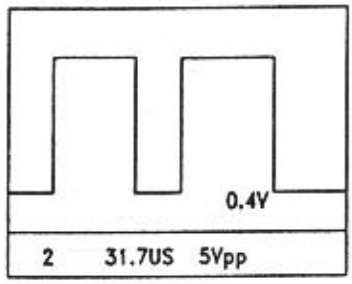
Reference Waveform

Q311 Collector



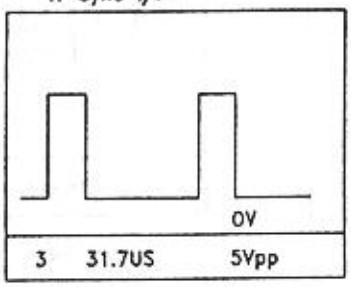
1 31.7US 15Vpp

IC301 PIN9



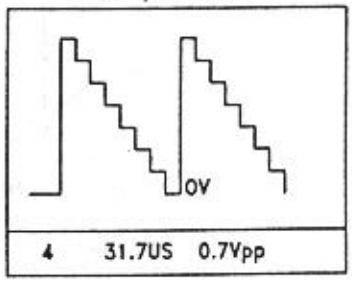
2 31.7US 5Vpp

H-Sync I/P



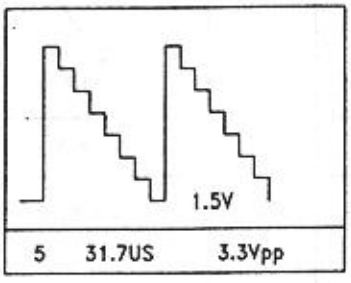
3 31.7US 5Vpp

Video I/P R.G.B.



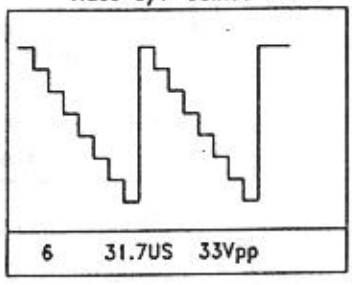
4 31.7US 0.7Vpp

IC101 PIN 25,20,16



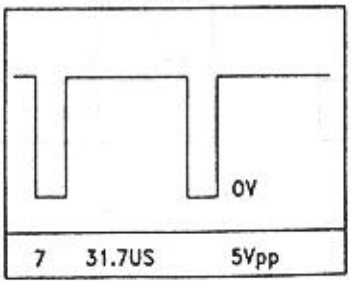
5 31.7US 3.3Vpp

Video O/P Cathod R.G.B.



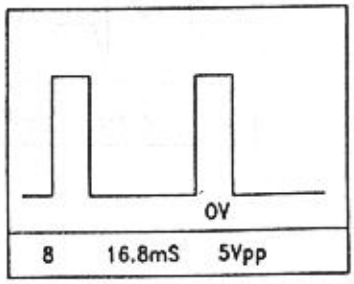
6 31.7US 33Vpp

IC101 PIN14



7 31.7US 5Vpp

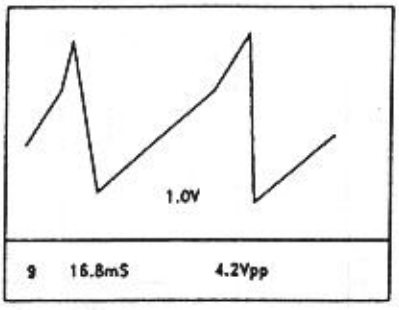
V-Synce I/P



8 16.8mS 5Vpp

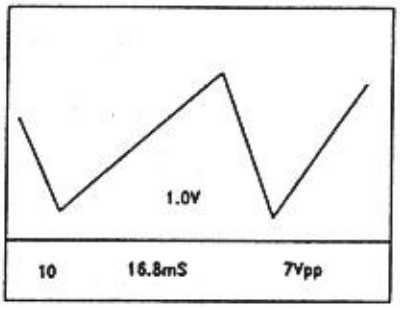
Reference Waveform (continued)

IC202 PIN3



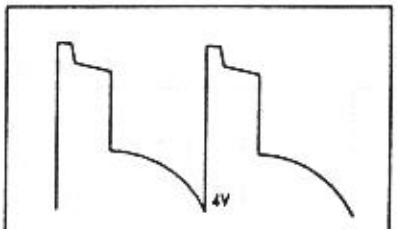
9 16.8mS 4.2Vpp

IC202 PIN9



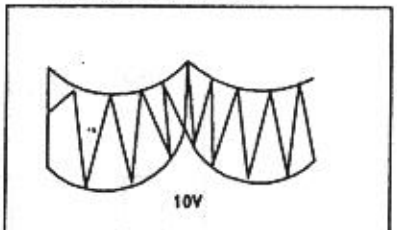
10 16.8mS 7Vpp

V-O/P IC-202 PIN1



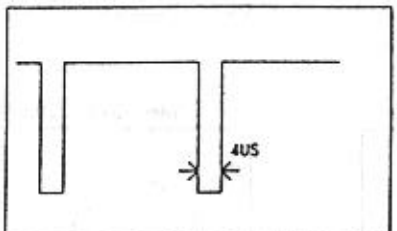
11 16.8mS 36Vpp

D304, D305 Connect Point



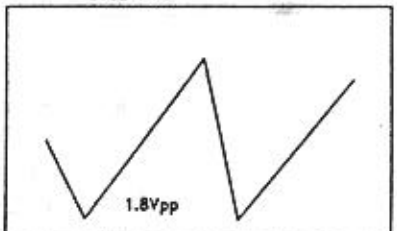
12 16.8mS 150Vpp

IC406 PIN7



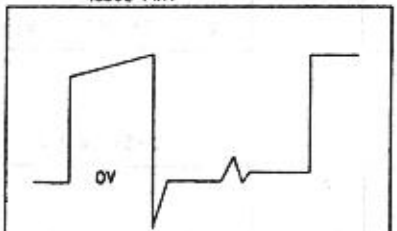
13 5Vpp

IC302 PIN7



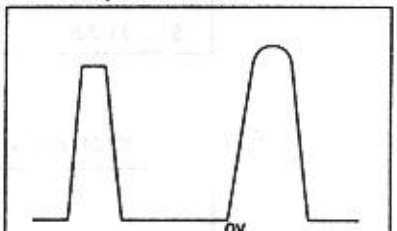
14 31.7US 3.4Vpp

IC302 PIN1



15 31.7US 0.7Vpp

H-O/P Q312 Collector



16 31.7US 1280Vpp

THE INFORMATION CONTAINED IN THIS SERVICE GUIDE CONSISTS OF CONFIDENTIAL AND PROPRIETARY INFORMATION OF OPTIQUEST, AND CONSTITUTES A TRADE SECRET OF OPTIQUEST. THIS DOCUMENT MAY NOT BE COPIED, PHOTOCOPIED, REPRODUCED, TRANSLATED OR REDUCED TO ANY ELECTRONIC MEDIUM OR MACHINE READABLE FORM, IN WHOLE OR IN PART, NOR MAY ITS CONSENTS BE DISCLOSED TO ANY THIRD PARTY, WITHOUT THE PRIOR WRITTEN CONSENT OF OPTIQUEST REPRODUCTION IN ANY FORM OF THE MATERIAL CONTAINED HEREIN OR THE DISCLOSURE, CIRCULATION, TRANSFER OR OTHER COMMUNICATION TO OTHERS OF THE MATERIAL CONTAINED HEREIN WITHOUT THE WRITTEN CONSENT OF OPTIQUEST IS PROHIBITED.

Table of Contents

1. System Overview

1.1 Introduction 1-1
1.2 Specifications 1-2
1.2.1 Physical Specifications 1-2
1.2.2 Picture Tube 1-2
1.2.3 Video and Synchronization 1-2
1.2.4 Text Mode Resolution 1-2
1.2.5 Graphics Mode Resolution 1-3
1.2.6 Misconvergency 1-3
1.2.7 Linear Distortion 1-3
1.2.8 Size Stability 1-3
1.2.9 Geometric Distortion 1-3
1.2.10 Power Supply 1-4
1.2.11 External Connector 1-4
1.2.12 Controls 1-4
1.2.13 Character Matrix and Display Color 1-4
1.2.14 Ambient Temperature 1-4

2. Theory of Operation

2.1 Power Supply Subsystem 2-
2.1.1 EMI Network 2-
2.1.2 Rectifier and Filter 2-
2.1.3 PWM Controller 2-
2.2 Deflection Circuit 2-
2.2.1 Micro Control Circuits 2-
2.2.2 H-phase Control Circuit 2-
2.2.3 H-size Control Circuit 2-
2.2.4 V-center Control Circuit 2-
2.2.5 V-size Control Circuit 2-
2.2.6 Side-pincushion Control Circuit 2-
2.2.7 Horizontal Deflection Circuit 2-
2.2.8 Vertical Deflection Circuit 2-
2.2.9 Hold-down Circuit 2-
2.3 Video Board 2-
2.3.1 Video Processor 2-
2.3.2 Video Amplifier 2-

3. Adjustment Instructions

3.1 Adjustment Tools 3-1
3.2 Preliminary Adjustment 3-2
3.2.1 B+ (25 V) Adjustment 3-2
3.2.2 H-Hold Adjustment 3-2
3.2.3 High Voltage Adjustment 3-2
3.2.4 Clearing EEPROM Data 3-2
3.2.5 Factory Presetting Modes 3-3
3.2.7 Background Adjustment 3-4
3.2.8 Foreground Adjustment 3-4
3.2.9 Focus Adjustment 3-4
3.2.10 Purity Adjustment 3-5
3.2.11 Static Convergence Adjustment 3-5

4. Troubleshooting and Safety Instructions

4.1 No Raster/No Work 4-1
4.2 No Horizontal Sweep 4-2
4.3 Unstable Horizontal Display 4-3
4.4 Unstable Vertical Display 4-4
4.5 Poor White Balance 4-5
4.6 No RGB Video Signals 4-6
4.7 Poor Side Pincushion 4-7
4.8 No Contrast Control 4-8
4.9 No Brightness Control 4-9
4.10 No Blanking 4-10
4.11 Safety Instructions 4-11
4.12 Servicing the High Voltage System 4-11

Appendices

A. Layout Diagrams

A.1 Mainboard A-1
A.2 Control Panel Board A-2
A.3 CRT Board A-3

B. Circuit Diagrams

C. Spare Parts Diagram

D. Spare Parts Lists

E. Reference Waveform

List of Figure

2-1. Power Supply Block Diagram 2
2-2. Deflection Circuits Diagram 2
2-3. Video Circuit Block Diagram 2
3-1. Magnet Location 3
3-2. Static Convergence Adjustment 3

List of Table

2-1. Horizontal Sweep Signal Settings 2
3-1. Factory Presetting Modes 3

About This Manual

Audience

This service guide is primarily for system engineers, service engineers, distributors and dealers. It carries the assumption that the reader understands the basic monitor operating concepts.

Purpose

This manual contains reference data for Optiquest 2000DX monitor. It gives information regarding the operating principles of monitors, as well as technical service and maintenance information.

Scope

The manual gives an overview of the monitor, plus the theory of operation of the motherboard and CRT board.

Chapter 1	*System Overview* gives an overview of the monitor and a complete list of its specifications.
Chapter 2	*Theory of Operation* shows how the power supply, deflection curcuit and the video board in the monitor function as a whole.
Chapter 3	*Adjustment Instructions* describes how to adjust the screen display, if necessary.
Chapter 4	*Troubleshooting and Safety Instructions* contains the flowcharts for troubleshooting the monitor, and lists the guidelines for safe operation and service of Optiquest 2000DX monitor.
Appendix A	*Layout Diagrams* shows the board layout for mainboard, control panel board and CRT board.
Appendix B	*Circuit Diagrams* shows the interrelationships between chips on the circuit boards.
Appendix C	*Spare Parts Diagram* shows the locations of individual spare parts.
Appendix D	*Spare Parts Lists* contains spare parts numbers, names, parts locations, and quantity used.
Appendix E	*Reference Waveform* contains the waveform charts for service and maintenance reference.

Chapter 1

System Overview

This chapter introduces the Optiquest 2000DX monitor and list its specifications.

1.1 Introduction

The Optiquest 2000DX monitor is a high performance low price monitor. It is a 15-inch autoscan intelligent color monitor designed for use with high-end Windows and CAD/CAM applications. This model is compatible with all computers with computer/VGA card horizontal frequency outputs between 31KHz and 36KHz. The possible modes range from VGA to UVGA3 (1024 x 768 non-interlaced at 59.524 KHz). It is equipped with a universal power supply and a microprocessor with powerful memory. It is unnecessary to set power voltage for either 115V or 230V because the universal power supply compatible with any voltages between 90V and 264V. The microcontroller has the memory capacity to store 32 different display modes including timing formats and display setting. With the exception of preset modes, it also allows users to put their own display settings into memory via external controls. In addition, its ergonomic design offers a tilt-and-swivel base and refresh rate, significantly reducing eyestrain.

1.2 Specifications

1.2.1 Physical Specifications

Item	Specification
Weight Dimensions	15 kg 364 mm (W) x 355 mm (H) x 384 mm (D)

1.2.2 Picture Tube

Item	Specification
Size Dot pitch Phosphor/persistence Surface/transmission	15-inch diagonal, square/flat face 0.28 mm P22/medium short non-glare/semi-tinted

1.2.3 Video and Synchronization

Item	Specification
Video input	15-pin mini D-sub male connector (positive)
Horizontal synchronization	31 to 60 KHz
Vertical synchronization	50 to 90 Hz
Bandwidth	80 MHz
Display size	260 mm (W) x 195 mm (H)

1.2.4 Text Mode Resolution

The text mode resolution is 720 x 400 for all modes.